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Making Little Ones Out of Big Ones

A SYMPOSIUM on methods of breaking up long, heavy chips incident to the use of tungsten-carbide cutting tools

LONG CHIPS are not peculiar to tungsten-carbide cutting tools. Even in the days before high-speed steel, records for long chips were sought. Almost every shop had a phenomenally long chip draped around its interior, or had a photograph of one. There is, however, a decided difference between trying to cut long chips and having them thrust upon one. The problem changes from how to cut to how not to cut them.

The usual method of breaking up chips in those days was to "hook grind" the tool or to clamp a piece of rectangular steel about $\frac{3}{16}$ in. thick in the tool post on top of the tool. The front end of this chip breaker was rounded, and differed little, if at all, from one now offered as a patented article.

Chips of ordinary bessemer or open-hearth steel can be broken with comparatively little effort, but when it comes to nickel and other alloy steels the problem is serious. Some time ago I visited a shop where they were trying out a tungsten-carbide tool on a nickel-steel shaft. As far as observation of the cutting process was concerned we might as well have been absent, because we had to stand at least ten feet from the lathe. I was told that they had tried a tool on a six-foot gear on a boring mill, and the chip actually took charge, making it necessary to pull the main switch. The ordinary method of striking the chip with a file does not suffice on a heavy nickel-steel chip, nor on a comparatively straight chip from a boring mill.

Inquiry among other users revealed that the trouble was general, and the firms producing the tungsten-carbide tools had no specific remedy aside from the patented breaker previously referred to.

Increase in the size and power of machine tools and the increasing use of alloy steels will make the matter of chip breaking more important as time passes. In order to get a cross-section of experience inquiries were sent out to people in England and Continental Europe, as well as in the United States, asking for information on chip breaking. The answers received are published below. Some received suggested similar methods, others had no method to suggest. The subject is not considered closed, and it may be that someone else has a better solution than any thus far offered.

In visualizing the problem of chip breaking, it might be born in mind that ordinary chips are not being considered, but chips, similar to those described above, that cannot be broken by ordinary methods. We feel that this has not been fully recognized in some of the communications received. It will be noticed, incidentally, that the method of applying the tungsten-carbide tips in Europe differs from ours. Their tips are vertical, while ours are horizontal.

Charles R. Whitehouse

Chief Time Study, Holtzer-Cabot Electric Company

WE HAVE FOUND that any separate method for breaking chips is unnecessary if the tool is ground properly for the particular job. We cut boiler plate in a Sundstrand Stub Lathe and we have had no trouble in the three months the tool has been used. As we do a fine grade of work we generally finish with a fine chip that will break up of its own accord, but when taking a roughing cut the tool is ground to the shape we have been accustomed to use for cast iron. Although the makers do not advise grinding tools in this manner, we have found that it can be done without difficulty or dam-

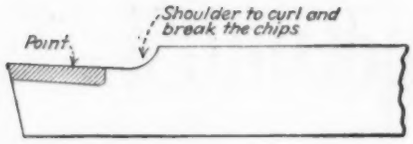


Fig. 1 — Shoulder machined in tip holder to break chips

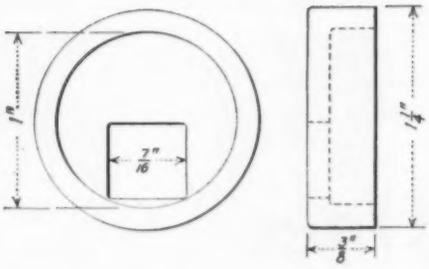


Fig. 2—Disk chip breaker that might be adapted to multiple tooling

age, if judgment is used in doing it. A tool may also be ground as shown in Fig. 1. This does not weaken the tip materially.

In the considerable time that we have been using tungsten-carbide we have had no trouble whatever. I attribute this to the methods we use in shaping the tool. I submit a few designs that are doing good work and are not causing us any chip worries.

Use	Clearance, Deg.	Tool Angle, Deg.	Top Rake, Deg.	Side or Back Slope Deg.
General	7	72	11	4
Hard iron	3	83	4	4
Soft steel	8	62	20	4

It might be well to try reducing the feeds and increasing the speeds, as these are important factors in chip breaking. It might also be well to experiment with the tool angle to suit the individual problem; we found that a change of as little as 2 deg. in the cutting angle increased the efficiency of the tool three or four times.

Arthur Bramwell

ON AUTOMATIC and semi-automatic machines the problem of chip breaking has not been solved satisfactorily; or so I am informed by engineers in charge of tooling such machines. A tool ground with a lip is moderately successful in breaking up the chip, but the tool is weakened to such an extent that this method is not considered successful.

The only practical suggestion I can make is to arrange the feed mechanism of the machine so that once in so many revolutions there will be an idle revolution or part of one. This should allow the chip to drop and clear itself from the tool, and can be arranged to prevent any objectionable length of chip.

I believe this method will not be as hard on the tool as an ordinary intermittent cut.

Martin H. Ball

Mechanical Engineer

FOR SEVERAL years past, on work where long curling chips were objectionable, we have used quite successfully the simple breaker shown in Fig. 2. It is made of high-carbon steel and hardened. The rectangular opening is made a free fit on the cutting tool, and is used with the open side toward the work.

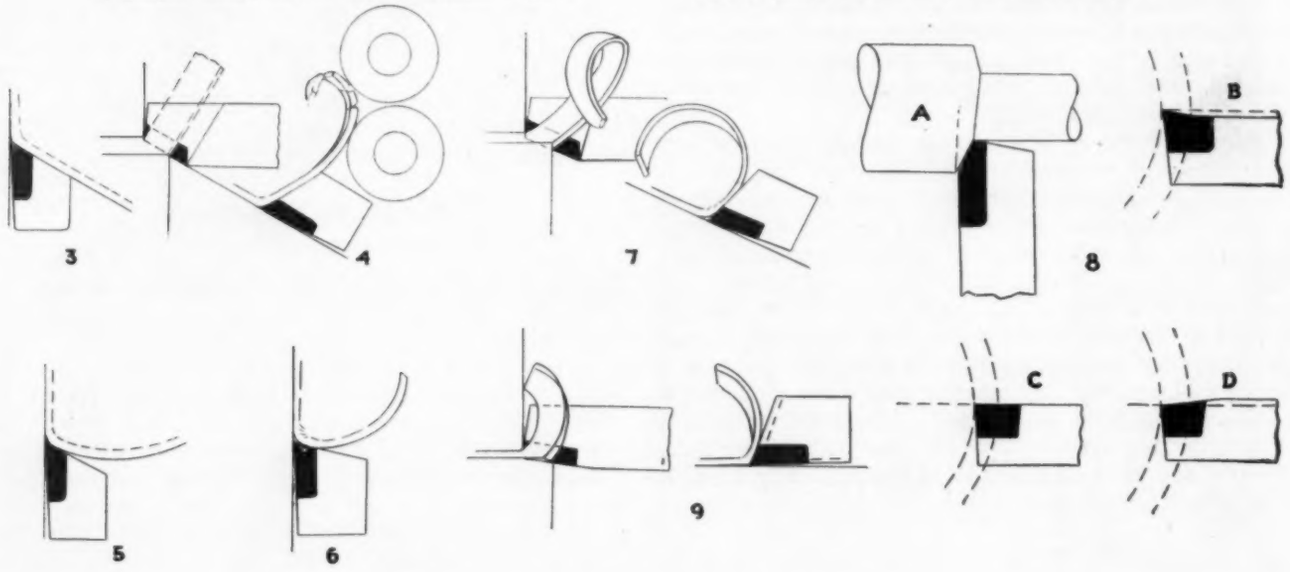
The depth and diameter of the recess into which the chips are forced and broken as they pass over the tool point, is varied as the individual job may require. The proportions shown work well under average conditions for a $\frac{3}{8}$ tool bit.

James R. Cornelius

Tool Engineer, Coventry, England

THE NECESSITY of extra appliances for the breaking of chips when utilizing tungsten-carbide

Fig. 3—Maximum possible top rake of about 30 deg. Chip is cool and straight. Fig. 4—Roller method of breaking up chips produced by a minimum cutting rake. Fig. 5—Top rake of 20 deg., showing the increased curl. The chip is heated to a brown-blue. Fig. 6—Top rake about 12 degrees. The chip curls tightly, is heated to a purple color, and is easily broken. Fig. 7—Chip produced by the positive cutting rake B in combination with a 12-deg. top rake. The chip may be broken by the cutting tool itself. Fig. 8—Showing attacking angle and different cutting rakes. The attacking angle is important from a power standpoint. Fig. 9—Combination of negative cutting rake D, Fig. 8, and 20-deg. top rake. Chip is curled back on the work and broken



tools is mainly due to the manner in which the turning, or cutting, tools are ground. Information supplied by the manufacturers of this metal is practically for the sole purpose of cutting metal with the minimum of power consumption for the maximum speed and chip removal; in no instance am I aware of data being supplied to facilitate the debarrassing of chips from the proximity of the tool point. Krupp's, of Essen, it is true, have devised a spring chip-breaking attachment which is clamped in the tool post and is supposed to give the chip an extra curl that is sufficient to break it, but this appliance not only causes extra heating of the tool shank, but, being made from spring steel, it rapidly loses its hardness and thus presents no, or very little, resistance to the acute abrasive action of the hot turning.

THE best method, when it can be used, to break the chip without excessive heating of the tool is to grind the tool in such a manner that the chip, as it leaves the stock, is curled already into a moderate radius, and directed onto the turned portion of the job. The turning will thus be subjected to the pushing action of the stock diameter and also to a bending stress due to the direction from which it attacks the bar. The result is that the turning is snapped short at the tool and tends to spring outwards. This latter tendency may be guarded against by placing a suitable sheet-metal shield between the tool and the operator so that the turning is redirected downwards, but care must be taken not to impede the hot air from rising above the tool. There are various ways of grinding tools, as every turner knows, but when using tungsten carbide, it must be remembered that this is an extremely fragile metal and the cutting edge must be well supported. This does not mean that big top rakes may not be used, for when turning free-cutting steels, a top rake of as much as 30 deg. may be employed. This rake is shown in Fig. 3, and the turning which is produced is indicated also. This turning will be found to be but moderately hot, barely yellow in color, and very tough to break. The power consumed in cutting is about the minimum. The best way to break this chip is shown in Fig. 4. The two rollers should be made from "Nitralloy" steel. As the chip leaves the tool, it is lifted by the first roller and directed against the second at such an angle that it usually breaks before contact. Here again shields should be employed to guard the operator. In Fig. 5 will be seen a tool with a top rake of about 20 deg., showing how the varying rake causes a difference in the curl in the turning. Fig. 6 shows the top rake at about 12 deg., the curl being greater still.

By different combinations of top rake with cutting rake, the chips can be deviated wherever one wishes, within reason. Thus, when employing a minimum cutting rake as shown at *C*, Fig. 7, the chips take the direction of the attacking angle, or at right angles to the cutting lip. As before mentioned, the curl will vary with the top rake but will always be directed away from the work. Such a chip may be broken by the roller method that Fig. 5 illustrates.

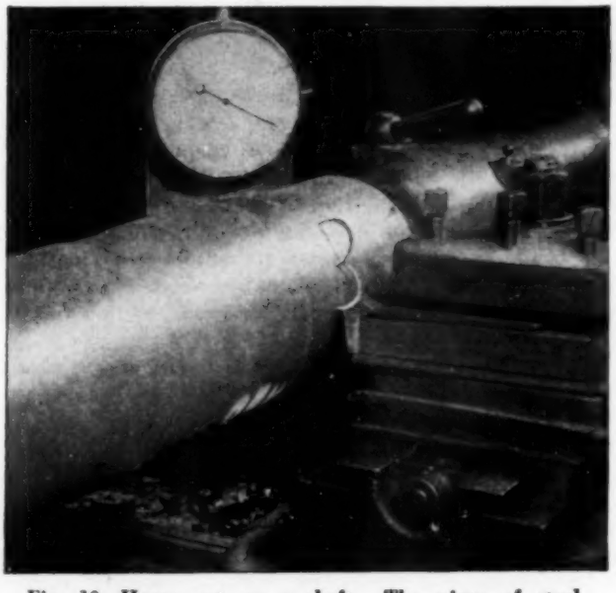


Fig. 10—Heavy cut on a shaft. The piece of steel clamped on top of the tool is acting as a chip breaker

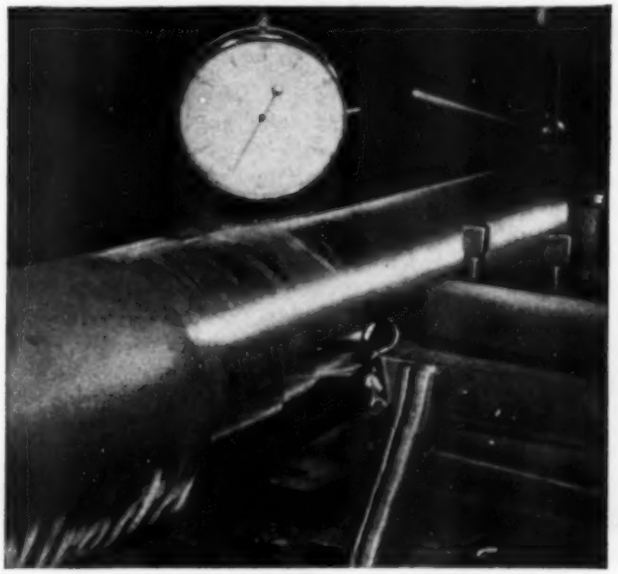


Fig. 11—Finishing cut. Such chips present no problem

With the positive cutting rake shown at *B*, Fig. 8, the chip will again be directed away from the job with a pronounced curl which will be accentuated by any decrease in the top rake. It is practically impossible to break this chip with rollers, as, even when a top rake of 30 deg. is employed, the curl is too large to allow rollers to be placed near the chip. A simple expedient is to decrease the top rake to about 15 deg. to obtain a small curl, and allow this to bite back into the tool, where it will break up itself without imparting too much heat to the shank, as shown at Fig. 7. Owing to the small curl, breaking will be performed fairly easily.

When using the negative cutting rake as shown at *D*, Fig. 8, the conditions are reversed, and with a top rake of about 15 to 20 deg., which will be found to be free cutting and cool for the tool, the chip will curl up in the opposite way and turn toward the work, as shown in Fig. 9. This will break it up into fairly small parts which can fall straight away into the chip pan.

ROGER D. PROSSER
Thomas Prosser & Son

I SUBMIT two photographs of chips in the formation, and an illustration of the method we recommend for breaking up the chips. Fig. 10 shows a roughing operation. The chips are curling up against the piece being turned and are breaking off in short sections. This is a

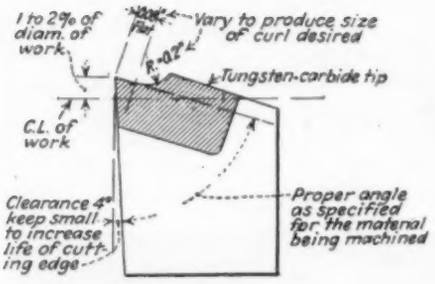

1 to 2% of diam. of work
Vary to produce size of curl desired
Tungsten-carbide tip
C.L. of work
Clearance 4° keep small to increase life of cutting edge
Proper angle as specified for the material being machined

Fig. 12—Method recommended for grinding chip breaker in a Widia tool

heavy chip, and while the piece of steel on top of the tool is not intended to act as a chip breaker, it is evidently doing so. The next illustration, Fig. 11, shows a finishing cut where the Krupp patented chip breaker is being used on a Widia tool; the chip, which is thin and ductile, curls readily. The diameter of the curl is controlled by the distance of the chip breaker from the cutting edge.

It is very important to maintain the proper tool angles for the materials being machined. This precludes the practice of grinding a depression back of the cutting edge. It is, however, possible to grind a tool so as to leave a shoulder some distance back of the cutting edge, to act as a chip breaker. The illustration, Fig. 12, shows that the surfaces of the top of the tool and the shoulder are parallel. The grinding is simply the equivalent of a movable chip breaker.

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Making Safety Rules and Enforcing Them—*Discussion*

W. R. NEEDHAM
Engineer, Design Department
English Electric Company, Ltd.

MR. CHILD'S note, on page 257, Vol. 72, of *American Machinist,* brings direct attention to an important aspect of an important subject. It is one thing to make excellent rules, quite another to insure that those rules are kept.

There can be no question that safety devices must be provided and that they must be *safety* devices. Most accidents are mishaps which can be and ought to be avoided. There are two ways of accomplishing this, and both should be attended to thoroughly. The guard or ward against danger must be there, and the "safety attitude" on the part of the employee must be encouraged. Negligence must be severely censurable, deliberately punishable. The safety attitude must not only extent to those who may blunder unknowingly into risks, but should also extent to those who are familiar with danger and accustomed to dodging it. Thus, for example, in an electrical workshop or laboratory where high-voltage testing is in progress, it is an enforced regulation that the danger notice shall be prominently displayed. That, however, in itself is not sufficient. The rule underlying the notice must be equally enforced. Neglect of the rule or disobedience in the due observance of it must be punishable, generally by the discharge of the guilty person or persons, if the precaution is to be effective. When a necessary precautionary measure such as this is really enforced, it only needs the realization on the part of the employee that the rules are made for his benefit.

NEW BOOKS

WELD DESIGN AND PRODUCTION (With Particular Application to Safety and Cost)—*By Robert E. Kinkead, consulting engineer. 108 pages, 5¾x8⅜ in. Cloth board covers. Illustrated. Indexed. Published by The Ronald Press Company, 15 East 26th Street, New York, N. Y. Price $4.00*

Dealing with these topics: how to design safe and sure welds, how to control the manufacturing process to insure the production of the welds designed, and how to predict and control the cost, this book is primarily concerned with problems arising in welding as a repetitive manufacturing process. Information on design which shows what happens inside a weld under practical service conditions is also applicable directly to individual repair jobs. The book is written for experienced manufacturing executives and engineers, and for the practical operator who wants a better understanding of his job. It is assumed that the reader understands the mechanical side of welding craftsmanship or employs welders who do. Its concise, straightforward, non-academic style will be found a distinct relief from the usual weighty tome.

Typical chapters include: Prediction in Manufacturing; Why Welds Are Made; How Welds Are Made; The Effect of Physical Conditions on Weld Behavior; Welding Procedure Control; Machine Welding; and Research and Development. The 54 illustrations of welded sections include charts showing sections of all kinds of welds under all kinds of conditions and picture clearly what happens inside when a weld is under load. The book is refreshingly free from propaganda, either for or against welding. It is a convenient-sized volume for the practical man.

MATERIALS OF ENGINEERING CONSTRUCTION.—*By Francis W. Roys, professor of mechanical engineering, Worcester Polytechnic Institute. 331 pages, 5¾x8⅜ in. Indexed. 167 illustrations and diagrams. Cloth board covers. Published by the Ronald Press Co., 15 East 26th St., New York City. Price $4.00.*

A new text for college engineering courses, this book has several noteworthy features which commend it for teaching purposes. It is an elementary treatment covering all the common and most widely used materials of engineering; the handling is clear, comprehensive, and concise. It is up to date and reflects the progressive improvement and development of engineering materials being freely illustrated to enable the student to visualize materials, their characteristics, and the best methods of testing them.

This text differs from materials handbooks in that it discusses the mechanics of materials, their structure, preparation, preservation, and uses. It is valuable to one wishing to learn the fundamentals of materials and their properties under varying conditions; it is less valuable as a ready reference for the production man or purchasing agent. It will appeal to those engineers and executives wishing to extend their working knowledge because of its comprehensive treatment, consideration of current developments, generous illustrations and practicality.

Milling Cams Correctly

A. L. De Leeuw

Rapid wear in barrel cams is avoided by a special machine which produces theoretically correct grooves

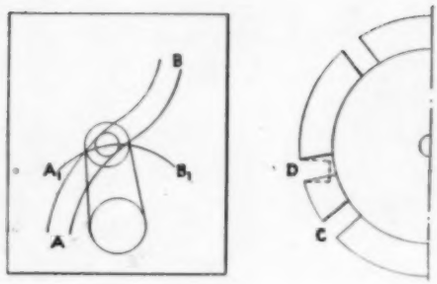

Fig. 1 — The angular motion of a pivoted cam-follower results in interference if the usual machining methods are employed

CAMS are not used to any large extent in machine tools. This does not mean that they are not used at all, but with the exception of a few kinds, machine tools use cams only for minor functions. In screw machines, of course, cams play a major role, but in most types of machine tools, cams, if they are found at all, are of such minor importance that many an operator is not aware of their existence in the machine he is running. That the machine tool gets along so nicely without them may be the reason why so little has been done in the design of machines for generating cams.

In many other classes of machinery, however, cams are of great importance. As a rule, machine tools require but the simplest movements to perform their various functions. The feed of a lathe carriage remains constant until the operator changes it by hand. The speed of a planer table remains constant during its entire stroke. In but a few machine tools are there elements which must work together in a definite but varying manner. This occurs, for instance, in a screw machine where the turret and a cross slide must operate on the piece of work, and where one might interfere with the other were not precautions taken to govern their movements so that this cannot happen. Such conditions could be met by the use of the standard elements of machine tools: gears, shafts, and clutches, but the arrangement would surely be very complicated. The use of cams simplifies the construction considerably, and at the same time, makes it more positive. In other classes of machinery, the requirements are often more complicated and could hardly, if at all, be met by the simple means employed in machine tools.

Some element of an automatic production machine may have to advance at a relatively high speed, then retard its action, stop a while, advance again at a different rate, retreat a short distance, advance once more at an accelerating or retarding rate, and then return to its starting point; meanwhile some other element may have to move through a similar cycle, keeping a predetermined timed relation with the first. Though it would be foolish to say that there is no possibility of accomplishing this by other means than cams, it is safe to say that few designers would attempt it.

The machine illustrated here is for the purpose of cutting barrel cams. There are other machines in existence for this purpose, but all commercial machines of this kind generate cams which give the roller, acting in the groove of the cam, a rectilinear motion. The method of cutting the cam is always by the use of a master cam, which may be of the disc or barrel type. The axis of the cutter remains stationary, the cam to be cut is revolved about its axis, and at the same time, is reciprocated axially by the master cam. Such a cam is correct, if it is meant to give a rectilinear motion to the roller which engages it in the machine. But if the roller does not move in a straight line, but is attached to a swinging lever, such a cam is not correct and leads to a great deal of trouble.

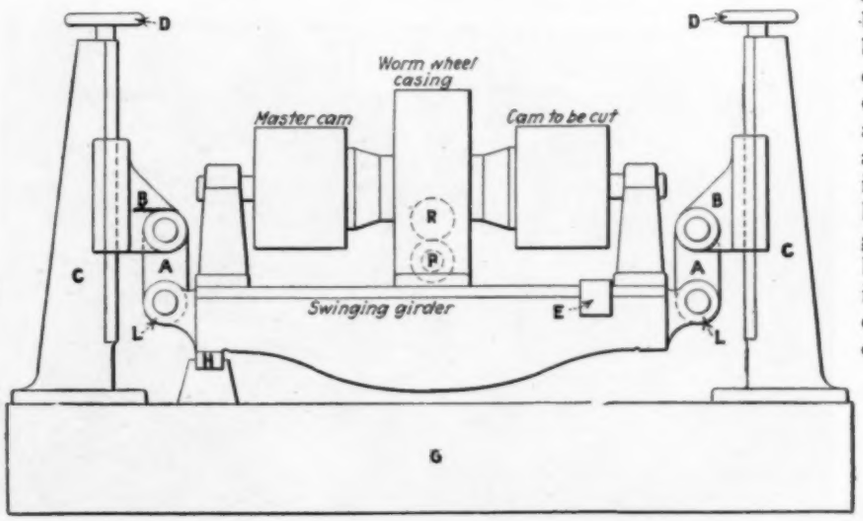

Fig. 2 — A swinging girder allows motion between the cam blank and cutter which compensates for the angular path of the cam roller

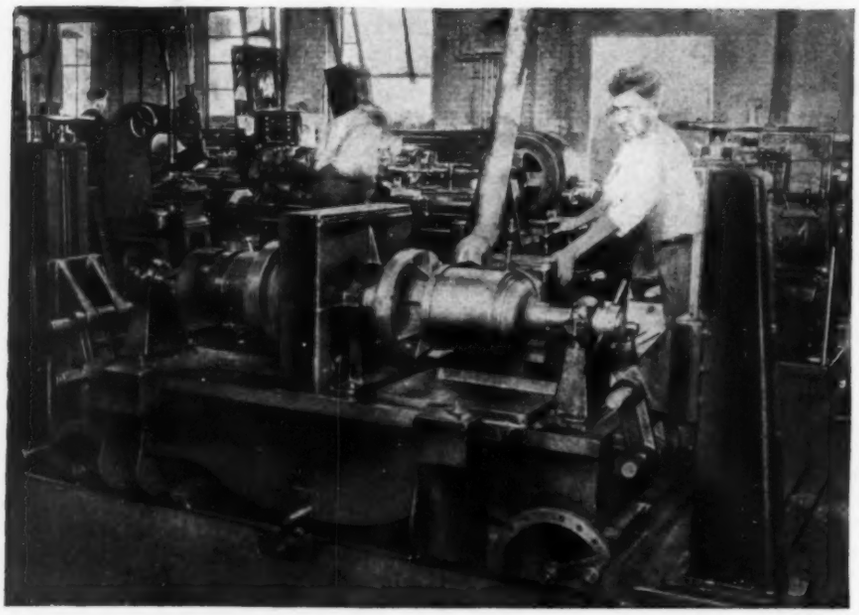

Fig. 3—Rear view of the machine showing the guide roller and wedge-adjusting levers

Fig. 1 shows why this is so. This cam groove AB works on a roller held by a swinging link. The roller is shown on the level of the axis of the cam, but when the cam rotates from A to A_1, the roller assumes a position below the axis. The cam was cut with a cutter pointing toward the axis. An element of the cam groove taken at A is shown at C. This same element is again shown in full lines at D when the cam has turned from A to A_1, and the position of the roller is shown at the same point, but in dotted lines. One end of the roller corresponds with the element of the groove as cut by the cutter, but the other end does not. It corresponds to some part of the groove which is some distance below the point A_1, and does not therefore fit the groove.

When a cam cut in this manner is assembled in a machine, it will be found that the roller binds in the cam. It is then necessary to take the cam out of the machine and try to correct it by filing or scraping. Once more the cam is put in position, and probably once more it will be found that the roller does not fit. By repeating the operation a sufficient number of times, a condition will finally be reached where the roller no longer binds, but it is evident that, though the binding action has been eliminated, there is no longer a fit between the roller and the cam groove. There will be only a point contact, with a consequent excessive wear of the cam or the roller.

To obtain a cam which will produce the proper action and retain the proper fit between roller and groove, it is necessary to give the cutter the movement which the cam produces on the roller. In other words, the cutter should be mounted in a swinging lever having the same length as that on which the roller is to be mounted, or else, as might be suggested, swing the cam itself.

The foregoing considerations led to the construction of the machine illustrated here, which is shown in diagrammatic form in Fig. 2. The master cam and the cam to be cut are mounted on the same axis. Both are driven from face plates on the sides of a worm wheel casing. The worm wheel is driven through a universal shaft from the feed mechanism of the machine. As the cams rotate, a pilot roller acting on the master cam causes the cam to move sidewise. Cams, worm wheel casing, and outboard bearings are all mounted on a heavy swinging girder.

This girder is hung from two links A, pivoted in saddles B, which can be moved up and down on the columns C by means of handwheels D. The pilot roller and the cutter are behind the plane of the drawing. The links A are of the same length as the lever arm on which the roller is to be mounted in actual operation. Heavy rollers E guide the girder and prevent it from swinging sidewise. There are four of these rollers, two in front and two in the rear. They are mounted in heavy brackets on eccentric studs to provide for take-up. Two of these brackets can be plainly seen in Fig. 3; they are attached to the bed plate G (Fig. 2). The bed plate is not visible in Fig. 3 as the machine is set below the floor level to facilitate the handling of the cams, some of which are quite heavy.

When starting the cutting of a lot of cams, the master cam is first placed in position. In Fig. 1, the roller lever is shown in a somewhat inclined position. This would cause the roller to assume a position slightly above the axis of the cam when the lever is straight up and down. Sometimes the relative position of roller and cam in the machine in which they are to work is such that the arc described by the roller is tangent to the axis. As shown here, it crosses the axis; in other designs it may lie entirely below the axis. In all instances, the roller describes

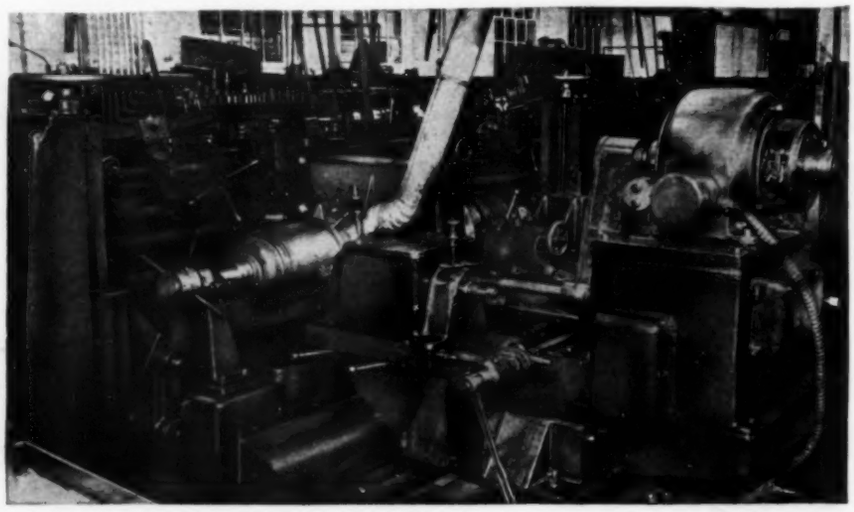

Fig. 4—The vertical saddles are set to the correct link length for the cam design

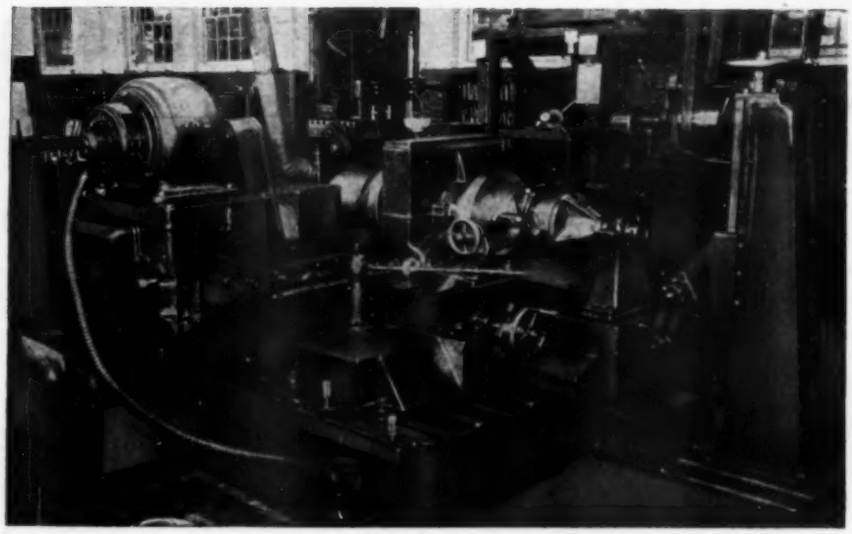

Fig. 5—The master cam engages a fixed roller to actuate the cam blank during the cut

a true circular arc as it is moved by the cam, and this arc is reproduced by the swinging girder. When the links *A* are vertical, the cutter should be set in the same relation to the cam that roller will later assume in the assembled machine. To do this, it is necessary to raise or lower the entire girder with all that is on it; so the first thing to do, when setting up the machine, is to place this girder in the proper position vertically. This is done by means of wedges of which there are two, one being shown in Fig. 2 at *H*. These wedges are pulled or pushed by means of the handles seen in Fig. 3. A detent pin, engaging the holes of the segment, provides for the various positions of the girder for all the cams that are to be cut. In the particular machine illustrated, there were only as many positions required as there are holes in the segment. Some other shop might require many other positions, and in that event, it might be advisable to have a micrometer arrangement so that the girder could be set to any height desired.

WHEN the girder is located for height, the links are placed in the ears *L* on the girder, and the saddles *B* brought down or up until a pin can be inserted through the upper ends of the links and the eyes of the saddles. The saddles are then clamped and the wedges withdrawn, leaving the girder free to swing.

The pilot roller is then inserted into the groove of the master cam. The roller is mounted on a heavy spindle in a bracket which can be adjusted to and from the master cam as well as sidewise. This bracket with its saddle is then clamped to the bed.

The machine may now be started. A roughing cutter has been placed in the spindle, and the entire spindle head brought forward by means of a ratchet lever until the cutter enters the cam blank to the proper depth. The cutter head is then clamped securely. The feed is thrown in, which causes the cams to revolve and the pilot in the master cam to give the proper sidewise movement. When a track has been completely rough-cut, the same operation is repeated with a finishing cutter. The finishing cutters are of the proper size and are used until they need grinding, after which they are ground down to size for the roughing cut.

There are a number of interesting features in this machine besides those required for generating the proper shape of cam groove. Fig. 5 shows the doors covering pick-up gears for the speed and feed. There is another door at the opposite side of the drive-head which also covers a set of pick-up gears for the feed. The purpose of these two sets of gears is to avoid calculations. If, for instance, a cam 11 in. in diameter had been previously cut with a feed of 4 in. per minute, how should the change gears for the feed be changed if next a 14-in. cam is to be cut with a feed of 2½ in. per minute? As this machine is arranged, such calculation is not necessary. A tabulation shows the operator what one set of change gears should be for a 14-in. cam, regardless of the amount of feed per minute, and what the other set should be for 2½-in. feed, regardless of the size of the cam.

In Fig. 2 two centers are shown in the worm wheel casing. The worm itself is at *P*, but the universal shaft enters at *R*. A couple of spur gears inside of the casing connects these two centers. This construction is used so as to make it possible for the worm to run in oil without having to use a stuffing box.

The columns *C* are made much taller than would be required for the longest link which would correspond to a swinging roller lever. When the saddles are at the uppermost position, the links become such a length that this machine can be used for cams which give a rectilinear motion to the roller. Though it is true that the girder is still swinging, the arc is so flat that the error is negligible. It will be noticed that the top of the worm wheel casing is flat. This is for the purpose of attaching a small swinging crane to lift heavy cams.

Though the purpose of the design was primarily to make correct cams, the massive construction of the machine makes it possible to produce them at a much more rapid rate than before. It used to take eight hours to go once around the groove of a 14-in. cam (width of groove, 1⅜ in. and depth, ¾ in.) but this was before modern cutters were used. In later years, this time was reduced to two hours. The present machine does it in 8½ minutes. The same amount of time is required for the finishing cut. Cams of high-speed steel require 20 minutes for one cut. The upper side of the cutter does the cutting, so that the chips fall free, greatly aiding the speed of the cut. The machine, which is patented, was designed by me for the Stokes and Smith Company of Philadelphia, manufacturers of box-making and packaging machines, and was built by the American Machine and Foundry Company of Brooklyn.

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In grinding very soft metals some find it advantageous to use a little paraffin wax on the wheel or hone. This prevents the spaces between the grains being loaded with small particles of metal and scratching the work. The wax also gives an improved finish to the work.

EXECUTIVE FORUM

The More the Brainier?

BILL HOLLAND and Ralph Purdy stepped into the main press shop of the Prescott Manufacturing Company. Purdy, who was works manager of the plant, had asked his friend Holland to inspect a proposed rearrangement of the machine layout.

"I see you believe in the huddle system here," said Bill, indicating a point halfway down the main aisle where a number of men were grouped around one of the large double-action presses. "What's going on—secret practice for the football season?"

Purdy grinned. "No, we've got the first forming die for the new tonneau back on that machine. It's cost us twenty thousand dollars already, and the metal still tears. We're late in starting the run now, and the delay is getting serious. I told my assistant, Joe Meadows, to gather the best brains in the shop and stay with the job until it is right."

"If one man can do a job in ten days, ten men can do it in one day," said Bill. "You've at least a dozen men there, and they all look like foremen or supervisors of some sort. You'll get quick action—maybe. But isn't there any one man responsible for the work?"

"Why yes, the press shop supervisor," answered Purdy. "It's up to him to make things go on this floor, and he's down there now."

"I should think he'd work better with more elbow room," said Bill. "Who compose the gallery?"

"Well, there's the production manager, the chief die designer, the die layout man, the chief inspector, the double-action expert, the superintendent of the assembly floor, several machinist foremen—"

"Enough," said Bill. "But why all the talent on one job? Why not let the man, whose job it is, do it and release the rest of the overhead for other work?"

"There's no work in the shop more important than this just now," said Purdy. "Die work is ticklish business, and it takes all the brains we can muster to solve some of the kinks that occasionally come up. When we're up against a real tough problem like this, I know no better way to attack it than by full collaboration."

Holland shook his head skeptically. "It looks like the old committee system to me—many men, much talk, and little action. Modern management stresses individual responsibility as the best way to get things done. I don't pretend to be a die expert, but I can't see why a job like this should be an exception to the general rule."

"My experience has been that these floor conferences are a very convenient means of ironing out mechanical difficulties," said Purdy. "Discussion stimulates a man's train of thought—proposals are made and objections raised which often avoid expensive cut-and-try methods. Then there is an educational value to the system. The die designer may learn a better method for future use—when a decision is made we all know what is coming, and all have gained in experience."

"Theoretically it sounds good," said Bill, "but I've found that everybody's business is nobody's business. As near as I can make out, you have either one incapable man who needs eleven assistants to do his work, or you have too many supervisors on your payroll."

Topic suggested by James K. Matter, E. G. Budd Manufacturing Company

What Do You Think About This Problem?

Does the old adage that "too many cooks spoil the broth" hold true in the shop of today? Many plants use interlocking responsibility to a high degree, leaving few vital decisions to the individual. Important steps are left to the conference or committee for action. Has it been your experience that this procedure is productive of the best results? Or is it preferable to give a man sole responsibility for a job, and let him succeed or fail as the result of his own judgment?

. . . Discussion
of Executive Problems

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The Other Fellow's Toes

When business is slack, it would be a poorly managed concern that would not reach out and add new and profitable lines, regardless of the effect on competitors and industry in general. Thinking principally in terms of manufacturing machine shops, any addition to the regular product will involve much expense; and if a new item be added simply to tide over the period of depression, the shop may find its financial condition worse off than if it had avoided the new unit.

One must make sure that the proposed article will be in demand, and that there will be a large enough market to absorb the additional production. For simply thinking that one can steal his competitors trade is extremely hazardous; more often it proves to be a boomerang.

We have been associated with manufacturing machine shops and jobbing shops for thirty years. It is always the high hope of a jobbing shop to have a staple line of its own, marketable through various advertising mediums. Most people know that success can come through no other channel. It is this business of trying to produce a salable article, that has caused the tremendous expansion in the field of mechanics during the past fifty years. Today, one can see the results of such efforts as visualized for example in the great Ford plant in Detroit.

We have seen thousands of experimental schemes started, many failing, some succeeding, but all proving costly. Yet the money expended goes to needy workers; and whether the effort is successful or not, it shows the march of progress. —Raymond H. Dauterich, *The Crescent Engineering Company.*

Can Engineers Sell?

Some technical men are complete failures as salesmen, simply because they don't know how to transmit their knowledge. On the other hand, more men have failed as machinery and equipment salesmen than you would care to count. They lacked facts, essential information; they could not convince customers and prospects. The buyer who is out for facts must be shown, and he will not be hypnotized. Brass-tack facts, data, statistics, something to depend upon—these win him over. The machinery man who has his nose close to the product, understands all about it, can batter down any argument a prospect advances. Can the personality man do that? Will he even dare to invite: "Ask me any question about my machines; I can tell you just why and how these will help your plant?"

Some prospects can easily be sold by the experienced salesman, though devoid of important technical information. The particular, discriminating buyer, however, is interested in factful stuff. Too many times the salesman, bent on sales at all costs, succeeds in having machinery set up, which later proves disappointing to the customer. Something is lacking, somewhere, and the question of future goodwill with the buyer is problematical. More damage has been done by wrongly-sold machinery and equipment than may be imagined. An expert technical man avoids this.

I always advocate that the man going out on the road for sales should prepare himself by studying beforehand the product, preferably in the factory where it is produced. Each department should be gone through thoroughly. Not until he acquires all essential information, in connection with the machinery to be sold, is he ready to represent the product properly.

One of the most successful salesman I know is a man of few words. He is an A-1, experienced technical man. The facts he has at his finger-tips speak loudly. And facts count mostly, especially with machinery buyers. The machinery salesman cannot know too much about his product. The out-and-out salesman plays too much on the emotions, whereas the technical machinery man operates mentally. The latter does not go off on a tangent; instead, he stands on concrete ground.

—Frank V. Faulhaber.

Inspection or Discretion?

Of what use is the inspection department if the only duty of the inspectors is to check the piece by the drawing, and not to exercise their discretion? Are not these men put in their positions due to their ability and knowledge of the product, coupled with a share of good judgment? If the inspector's knowledge of the work told him that it was fit to use, I think the proper thing to do was to pass it and then notify the designer in writing that the limits on the drawing were too close, and recommend their being changed. Why pay a good salary to inspectors if all they are allowed to do is check; cannot the foreman do this himself, and save the additional expense? Any employer who puts a man in an inspector's position and then does not allow him to exercise his judgment, either shows that he is no judge of men or he is throwing money away. In any plant where I have been employed, the inspectors were men who were considered semi-research men, and whose ability had been proven; of course these men were being paid good salaries. What a fallacy it would have been to tie them down to a mere checking job. The inspectors should be allowed plenty of leeway if they are to accomplish anything.

—Charles R. Whitehouse, *Standards Engineer, The Holtzer-Cabot Electric Company.*

Jigs By Whom?

There can be little material difference so long as efficient tool designers are employed, and they and the chief tool designer have access to the department where tools previously made are kept, together with the records for them. It is imperative that they have this privilege, and that they avail themselves of it by referring to old tools constantly as to their design and performance. No tool

designing department can hope to work efficiently or economically unless it does so for two very good reasons. First, all designers learn to improve their designs by knowing the shortcomings of tools already in use, and second, tools become obsolete quickly due to the constantly changing designs of the parts for which they are made. Quite frequently it happens that old ones can be made to work satisfactorily for new parts by making some changes.

The tool designer or his chief who will not go into the factory, because of the odor of oil or the noise of machinery in motion, is not fitted to his job and is not working to his best advantage whether he be under the supervision of the factory or of the engineering department. The answer to the question is formed by determining which is the most qualified to select, and supervise an efficient tool designing department according to his own personal qualifications, the factory manager or the chief engineer.

—ROGER ENGLISH.

Is Incentive Necessary?

Perfect management precludes the necessity for a system of payment-by-result, but as no such thing exists an alternative must be sought. This is effected by establishing a system of payment-by-result in some form or other. An effective incentive can only be possible in the case of day workers, and each man must be paid for his individual effort. There are two schemes that have proved to be successful. One is the job work, and the other is the direct piecework system.

It has been said, and is often the cause for irritation, that pieceworkers—owing to their enhanced speed—required quicker and more effective service from the truckmen bringing parts and from the laborers that help them, so that it is advisable to pay laborers and truckmen a bonus based on the average earnings of the pieceworkers. Foremen, chargehands, and departmental managers, should be paid, according to their ability and the incentive in their case is the hope of an increase in salary as their efficiency increases. A nice way of dealing with this matter is for the firm, when the balance sheets are being prepared, to allow a certain sum to the staff for distribution prorata according to the profits of the company. This should not be compulsory; it must be considered as an act of grace on the part of the management.

—J. EARNSHAW,
Birmingham, England.

Inspection or Discretion?

I have found engineering departments too theoretical. In these days of hurry-up "to get somewhere", we find that the majority of people in this line of endeavor have neither the time nor the desire to become throughly conversant with all phases of manufacturing. An engineer today is far from being expert in his field both as an inventor and a master mechanic—he may be either the one or the other.

There are all too many chief inspectors who are neither technically trained nor possessed of a broad education and executive ability to be able to render expert and unalterable decisions concerning the passability of machines and their component parts. I am thoroughly convinced that these almost inherent weaknesses in the two branches of manufacturing are responsible for the widely divergent opinions among executives as to who is most competent to perform that function.

It is my contention that, if the chief inspector is an engineer who has had experience on the board, in the laboratory, and in the shop, the management need not hesitate to give him full authority to decide whether or not parts and machines which do not conform strictly to specifications should be passed.

—GEORGE BELBES, *Production Engineer,*
The Gaertner Scientific Company.

Too Much Specialization?

We have all seen, at some time or another, glaring examples of too much specialization, too much efficiency, or too much red tape, and enjoyed a laugh at the spectacle. However, it's not a laughing matter for the unfortunate stockholder when dividends are due.

In the extreme case recently presented where high-priced labor was utilized on low-priced work, the obvious remedy would be to set up an account against which the labor gang would charge clean-up time. I think the method in use at the experimental machine department of the Oakland Motor Car Company is even better. The three lowest priced men in the department (a grinding room apprentice, a steel stockroom man, and a tool-crib man) work two hours extra each week and assist the janitor in the weekly clean up. Thus, for only an extra expenditure of eight hours per week of low-priced labor, the shop is kept spic and span, and the dollar-an-hour men are kept on work commensurate with their pay.

Furthermore, small thefts have been eliminated, and responsibility for any sins of omission or commission can be accurately placed. It should be noted that straight time only is paid for such cleaning. Inasmuch as our shop has a normal force of 100 toolmakers, and uses a wide variety of machines, we consider that our clean-up cost is at the lowest possible level.

—E. R. SHIELDS, *Processor,*
Oakland Motor Car Company.

Jigs By Whom?

Jigs and tools are not drawing office jobs. They entail too many references to the shops, and even then, criticism and friction often ensue over the finished articles.

They should be in the hands of the manager or superintendent, who has the various shops under his charge. Since he is in touch with the foremen's requirements and work difficulties, matters are simplified, and the job is carried out smoothly and economically. The following example, though simple and unpretentious, is practiced at an important and high-class firm in this country. The manager has a young draftsman regularly employed in his office, designing jigs, tools, and fixtures, for all parts of the factory. He also arranges for the castings and forgings, which are sent to the toolroom. Being in hourly consultation with the chief and with various foremen, all conditions are met, and all parties satisfied. Though simple, it is nevertheless effective. Elaborate methods and a large staff are not always best.

—WILLIAM BRYCE, *Sheffield, Enaland.*

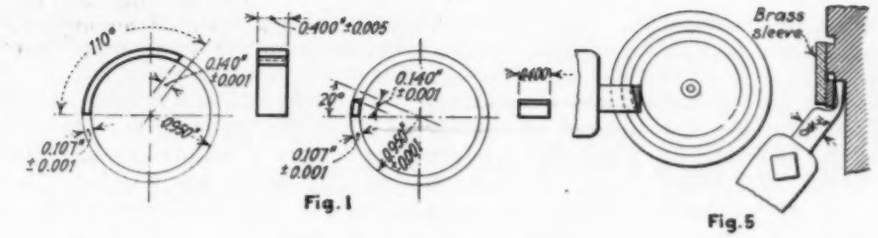

Fig. 1

Fig. 5

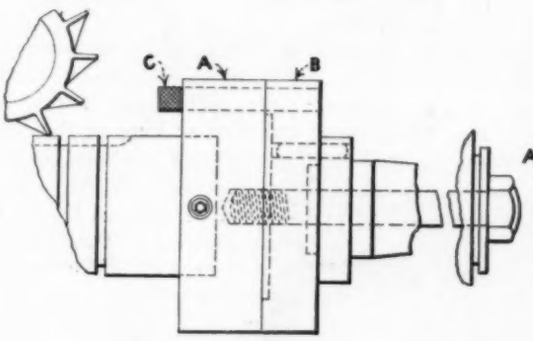

Fig. 2

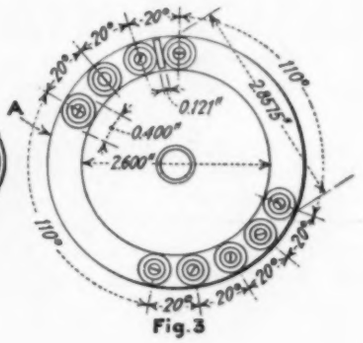

Fig. 3

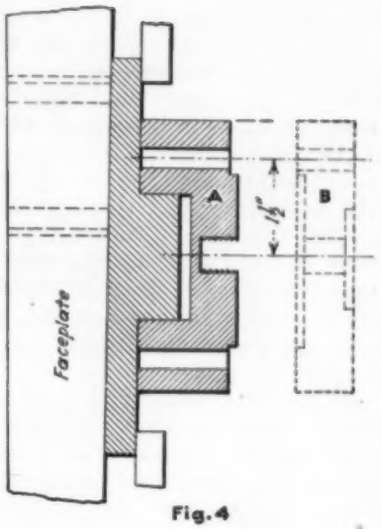

Fig. 4

Making Bakelite Segments on a Production Basis

WALTER WELLS
Malokhovka, near Moscow, Russia

A method of producing very accurate work on a production basis by the use of simple and ingenious tools

WE HAD to machine a large quantity of Bakelite segments for special commutators used in electrical recorders. As will be seen in Fig. 1, the segments are of two sizes and are made in lengths of arc that are a combination of angular and lineal measurements. One end of each segment is radial, while the other end is a continuation of a line parallel with a radial line, but 0.140 in. from it. The segments were trepanned from bars of Bakelite 20 in. in length and ground to 1.900 in. in diameter. They are 0.400 in. wide and 0.107 in. thick.

At first it was thought that involved mathematics would be necessary to determine the proper indexing to obtain the exact length of arc required. However, the problem was solved by using a cutter 0.140 in. thick, and so set that one of its sides was on a radial line from the center of the work, leaving the other side parallel with the radial line, but away from it an amount equal to the thickness of the cutter.

In striving to get a precise registering surface, recourse was made to wet grinding the Bakelite bars. With a full stream of water and a free-cutting wheel, it was a revelation to see how fast Bakelite can be reduced by grinding. While the bars had to be reduced a few thousandths to bring them to the required 1.900 in. in diameter, the operator found time during each roughing cut to cut off another 20-in. length in a power hacksaw, and to center-drill and countersink it. But the real virtue in the grinding lay in the smooth surface and accurate finish it gave.

After grinding, the bars were put in a lathe and gashed with a parting tool to a depth of 0.107 in. at intervals of 0.400 in. which are the thickness and the width of the segments, respectively. A ½-in. gage block was used as a carriage stop, and the tool was ground to a thickness of 0.100 in., so that the width between gashes would be equal to the length of the gage block, minus the thickness of the tool. Using a tool having plenty of

clearance, but without the customary rake, the finish on the sides of the cut was so smooth that a facing operation was unnecessary.

After gashing, the work was taken to a milling machine for the dividing operation. Since the job was to be put on a sound production basis, the likelihood of making mistakes in tallying the turns of the index crank on the dividing head was too great a risk, so we made the fixture shown in Fig. 2. The member *A* is a revolvable index plate and contains the holes necessary for dividing the bar for both sizes of segments. It has a recess in front in which the work is held by a setscrew, and a projection on the back fitting into a corresponding recess in the fixed member *B*. This projection serves both as a pilot and a bearing on which the index plate revolves.

In the fixed member is a single hole for the index pin *C*. Both members are mounted on a shank held in the spindle of the dividing head by a draw-in rod, the spindle being locked to prevent it from revolving. In finding the positions for the holes in the index plate, jig buttons were used, as shown in Fig. 3. Holes were drilled and tapped for the button screws as near the proper locations as was possible, the buttons being attached with their sides toward the center in contact with the periphery of the projection at the rear, centered on a 3-in. circle. Since the location of the buttons was taken care of in a radial direction, the only concern was for their proper spacing.

For spacing the buttons for the 20-deg. divisions, a piece of flat stock ground to a thickness of 0.121 in. (2 radius $\times$ sin 10 deg. — diameter of button) was placed between them successively. The 110-deg. division was taken care of by a micrometer, the distance across the outside of the buttons (2 radius $\times$ sin 55 deg. + diameter of button) gave 2.8575 in. as the setting for the micrometer. When all the buttons were set, their distances were verified. For boring the index holes, a plate having a projection to fit the work-holding recess in the index plate was mounted on the faceplate of the lathe, 1½ in. off center, being firmly clamped in position. Member *A* was mounted on this plate, the work-holding recess fitting snugly over the projection, as shown in Fig. 4, and was lightly clamped. The first button was brought into line and indicated, the member *A* being rotated in one direction or the other until the button ran true. The member was then clamped tightly, the button was removed, and the index hole was drilled, trued by boring, and reamed to size. All the holes were located and machined in the same manner.

WITH the last hole completed, member *B* was mounted on member *A*, the projection on the former fitting snugly into the recess in the latter. The two members were then clamped together and to the faceplate, and the hole for the index pin in member *B* was drilled, bored, and reamed.

The method of indexing was to pull the index pin out of the holes, slacken the draw-in rod, put the pin in the next hole in the index plate, and revolve the plate until the pin could be pushed into the hole in member *B*. Then the draw-in rod was tightened, clamping members *A* and *B* together. Since the cutter was off center an amount equal to its thickness, the cut was deeper at one edge than at the other. However, this variation in depth did not matter, providing the depth at the shallowest part was not less than 0.107 inch.

After index milling the bar lengthwise, it was mounted on centers in the lathe, and a bent parting tool was used to trepan the segments from it, as shown in Fig. 5. A brass sleeve about 1 in. wide and a wringing fit was placed on the bar to retain the segments as they were cut off by trepanning. After a set of segments had been cut from the bar, the sleeve was slid back, permitting the segments to fall into the operator's hand. The walls of the segments were then checked for thickness, any error being compensated for by adjusting the toolblock on the cross-slide.

The tool had no top rake and presented a square cutting surface to the work, obviating any tendency for it to cut out of the intended path. The segments were remarkably free from burrs and fins as long as the tool was kept sharp by stoning, the tendency to check on the corners, peculiar to Bakelite, being very slight. The quantity of segments turned out was 9,000 and the total time was 301 hours, including the making of the fixture. Since the segments were trepanned in sets, any accumulated error was prevented from piling up.

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Practical Heat-Treating in the Small Shop

Discussion

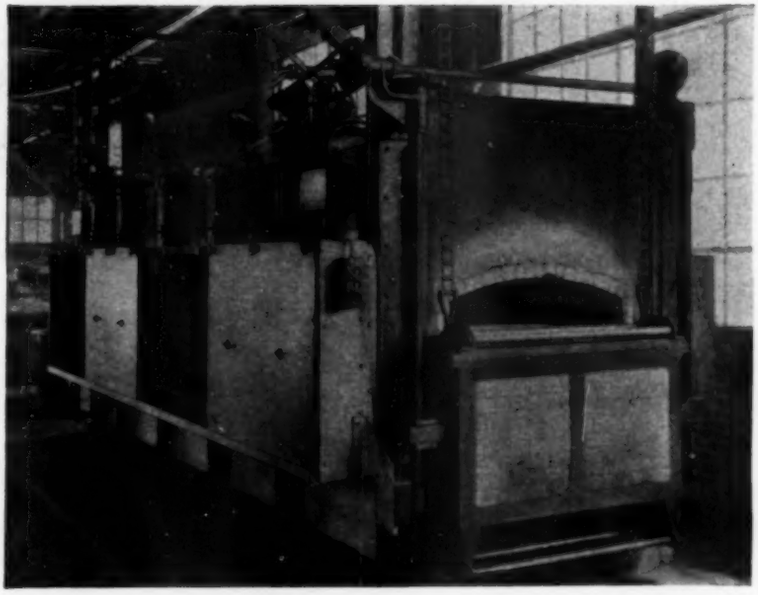
W. R. NEEDHAM
Stafford, England

ARTICLES such as that of Arthur Mumper, on page 699, Vol. 72, of *American Machinist*, serve a most useful purpose. As often undertaken, not only in small shops, but frequently in large concerns, the treatment is simply the worst possible mal-treatment. Too often the matter is left entirely in the hands and to the discretion of workmen who lack the technical knowledge necessary for such work. No effective measurement of temperature is employed, and even the need for a close observance of temperature ranges is not appreciated. However, the blame cannot rightly be put upon the shoulders of the workers, who do their best. It is strictly up to the employers to see that such important work is carried out under skilled and intelligent supervision. It is essentially the kind of job wherein the knowledge of the metallurgist has to be called upon. Many small concerns are not in a position to employ a full-time metallurgist. For special requirements, the aid of the expert can readily be enlisted.

Often for particular steels, and other materials such as the non-ferrous "duralumin," the makers issue instruction notes with the goods supplied. They are only too willing to supplement such information with particulars appropriate to the specific requirements of any job. These instructions are only effective when carried out intelligently. There are increasing numbers of workers who are familiar with the practical carrying-out of such technique under instructions.

In this connection, it is significant that the annual technical reports of the British Engine, Boiler, & Electrical Insurance Co., Ltd., generally contain one or more instances of fractures in material directly traceable to faulty heat-treatment, often undertaken by workmen who have not understood the real needs of the jobs. The remedy is in the hands of the responsible engineers of the company.

Decentralized Heat-Treating Equipment



Special semi-automatic electric tunnel furnace with two decks of power-driven rollers, used in heat-treating caterpillar tractor sprockets

FRANK J. OLIVER, JR.
Associate Editor

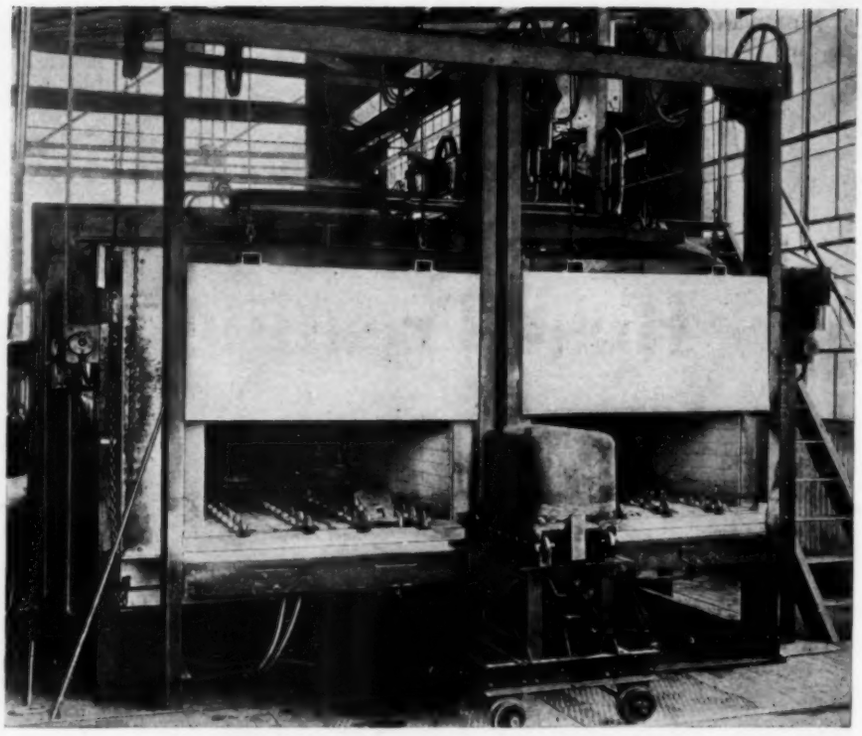
SOME plants prefer to concentrate their heat-treating equipment in a single department or section of the plant. In the Peoria, Ill., plant of the Caterpillar Tractor Company, however, such apparatus is scattered throughout the various buildings, being placed nearest the production machinery upon which the work to be treated is turned out. Much of this equipment is of conventional commercial type, but by far the larger portion is entirely special, designed and built by Caterpillar engineers to meet the special requirements of tractor production.

One of these special pieces is known as a roller hearth furnace and was developed to heat-treat tractor sprockets varying in weight from 50 to 230 lb. The hearth consists of two decks of rollers, each positively driven by roller chains with idlers to take care of expansion and contraction. To expose the upper deck, the heavy door is lowered through the medium of power-driven screws, actuated by push buttons; to expose the lower one, the door is elevated, suitable idler rollers being provided at top and bottom to facilitate the operation of loading and unloading the cast steel sprockets.

Electricity is the heating medium. The furnace is divided into three zones—preheat, heat, and hold—with two indicating controls in the first two zones and a recording controller registering the heat at the critical stage before quenching. Approach of the gears to the discharge door is indicated by signal lights; green for the upper deck, red for the lower, giving a warning of 3 to 4 minutes. Should the operator fail to open the door at the given time, a bell rings, informing him that the sprocket has gone past the allotted period and must be sent through the furnace again.

Upon emerging from the furnace, the sprocket castings are slid down ways consisting of a pair of I-beams to a quenching press, also of Caterpillar design. It has six hydraulic rams for supporting the work against distortion and a baffle deck for keeping the water away from the hub, which is left in an annealed condition. Powerful radial streams directed at the sprocket teeth localize the hardening at those areas where the greatest wear occurs. An annealing operation follows in a Homo electric draw furnace provided with the usual recording control apparatus. Because of the heat retained in the protected hub—it is still red hot when the sprocket is withdrawn from the press—the work is still warm when placed in the draw furnace, so that some heat economy is effected. Usually, several gears are accumulated before being loaded on a carrier fixture in the chamber.

Another unconventional type of furnace is represented in the pair of counter-flow electric carburizing units used for treating Caterpillar track parts, such as pins and bushings. In the first illustration a pot is shown on a charging buggy ready to be shoved onto the roller hearth. Upon entering the lane nearest the middle of the pair of furnaces, the pot passes over a latch which is part of the ram mechanism. At timed intervals this contact member moves forward one pot length, then retires to be ready to pick up another pot. When a pot has traveled the length of one row, it is pushed over to the adjoining row by a cross ram, then started on its outgoing journey by a pusher ram.



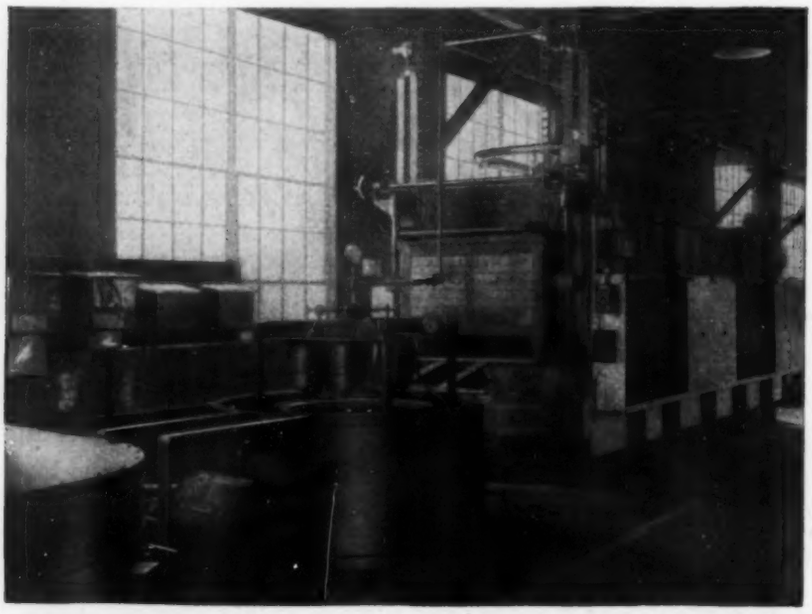
Front end of a pair of electric counter-flow carburizing furnaces, showing the charging buggy and the roller hearth

ALL three rams are actuated hydraulically, and because of the necessity of synchronizing the three movements, motor-driven cam control of the valves has been applied. All this mechanism, together with the electrical control apparatus, is mounted on the roof of one of the furnaces, an unconventional but very logical arrangement.

When fully loaded, each furnace contains 26 boxes per chamber, or 52 per furnace. These boxes go through in an inverted position, resting on the covers without the use of sealing clay. The cycle time can be varied from 52 to 110 minutes, or the total time from 23 to 50 hours. Five minutes before the rams move, signal lights warn the operator.

There is no wall between the chambers, so a heat interchange takes place between the cold entering pots and the hot ones leaving the furnace. On the incoming side, there are three zones, preheat, rapid heating, and hold, controlled by three non-recording instruments, one three-point instrument giving a combined record of the three zones.

Carburized pins and bushings are hardened in another special furnace of the tunnel pusher type. There are nine V-shaped grooves on which the parts are placed by hand and propelled by projecting pins on a power chain. At the discharge end the parts fall into funnel-shaped holders and are subjected to powerful streams of water, then ejected on to a chain conveyor which lifts them to a chute from which they drop into tote boxes.



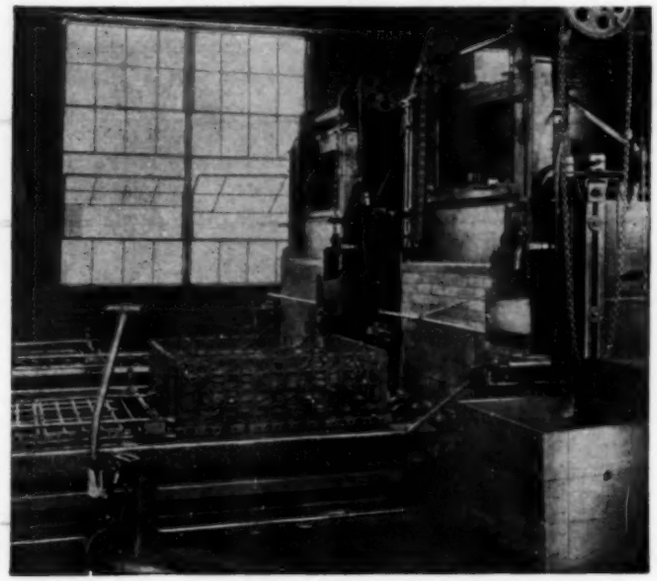
Work discharged from the roller hearth furnace goes into the hydraulic quenching press where selective quenching is effected by powerful water jets and baffles

The furnace is divided into two heating zones with thermocouples in both. One is connected to a controlling pyrometer; the other, the second zone, to a recording and controlling instrument. By means of a variable-speed drive on the tunnel conveyors, the cycle time can be varied from $\frac{1}{2}$ to $1\frac{1}{2}$ hours.

One of the latest units to be installed is an automatic hardening and drawing furnace for heat-treating track side links. This installation is a combination of a high-temperature furnace, a quenching machine, and a draw furnace. Loading of the first unit is by hand on a tray. The work is placed in four rows in a staggered position and is pushed onto a chain belt by pushers at timed intervals. At the discharge end, four chutes lead to a power quenching device consisting of an endless chain with shoes shaped to hold the track links. While the piece is held in the shoe by its own weight, powerful

jets of water are directed at those parts that are to be hardest, particularly the rail. The section that bolts to the track shoe is quenched only by splash and is therefore left in a somewhat soft condition.

From the quenching chain, the selectivity hardened links are delivered to an elevator which raises them to the top of the annealing furnace. This unit consists of a series of four chain belt conveyors arranged one above the other in a horizontal position and staggered so that when the work is dropped off the end of one conveyor it falls on the other and its direction of travel is reversed. Thus, in a concentrated space, by doubling back and forth, the necessary travel can be obtained to keep the work in the furnace the required period and at the same time give capacity or area to hold the work.



Forgings emerging from the normalizing section for an air cool before being sent into the annealing furnace by an intermediate charging mechanism operating through side rails

Both furnaces are heated electrically. The first has three zones, two with indicating controls, the last with a recording controller. There are also three controlling pyrometers in the draw furnace, with one three-point recording instrument connected to the three thermocouple units.

In the same building with the roller hearth furnace for track links is a series of normalizing and annealing furnaces for the routine treatment of all forgings, both medium and high-carbon steel, as well as alloy steel. These furnaces, of which there are four groups, are electrically heated and have some special features not found in such types. For each group there are two separate and independent furnaces with a cooling area in between and a separate charging mechanism for the second unit.

The work is piled on alloy grids placed on rails in front of the first furnace. When the doors are raised at both ends, a group of loaded grids is pushed into the furnace by a motor-driven ram and, by contact of the grids, discharges a like quantity of work at the other end. Because of the door widths, blank grids are placed between loaded ones. To reduce friction, inside the furnaces and between them are six rows of rollers.

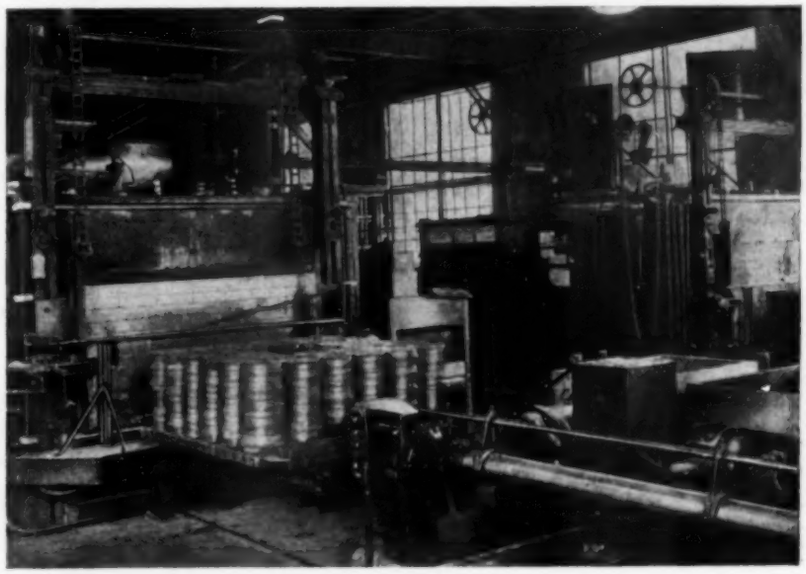
For heat economy, all doors are heavily insulated with brick and are clamped pneumatically to prevent loss of heat by convectional air currents. Extra heavy insulation also has been built into the furnace walls and roof, which is slightly arched on the outside for strength.

VERY little clearance is left in the chamber itself between the roof and the work, which must be piled quite accurately. In front of each furnace door is a horizontal clearance rod which can be swung out over the work as it stands ready for charging, thus checking the clearance.

Obviously, because of space limitations, a ram cannot be used for charging the second, or annealing, furnace. Instead, there is a set of ladder-like rails on each side, power driven through a ram below the deck. Through the "rungs" of the ladder can be placed channel-shaped crosspieces through which the work-holding grids are advanced. To pick up the grid after it emerges from the normalizing furnace, there is a screw clamp on each rail that allows the rails to be locked to the middle grid thus propelling the whole charge the distance of the ram movement. This brings the work in position for charging into the annealing furnace, as indicated.

These furnace units are arranged in pairs on either side of a central aisle wide enough to allow work to be toted through on hand lift trucks. There is also room for the supervisor's desk and for the recording control instruments by means of which the cycle is controlled.

■



Work about to be charged into an electric normalizing furnace by a power ram. Seal of the doors, which are manually operated, is by pneumatic clamps

The Foreman's Round Table

TRADE SECRETS

CHUCKLING as he walked up the front steps of Ed's house, Al said, "Say, did you ever think what a meaning you can read into asterisks, question marks, and dashes?"

"No. I don't read that kind of book—at least around home. I was reading about that darn Austrian glass blower that had a secret method of blowing glass flowers. He just died without telling anyone how he did it, because he didn't have a son to pass it down to. I don't think it will do him much good where he's going. He's just like those Egyptian forgesmiths that refused to tell whoever it was that captured them how to harden copper. Why couldn't they have written the stunt on a rock, like they did other things? Then some of these college dudes could have found the stone and figured it out for us."

"I expect, Ed, they were something like our modern smiths. When I was a journeyman, every blacksmith had a little bottle in his vest pocket. When he make a weld he would take the bottle out and scatter a tiny pinch of the contents on the weld. I expect that stuff in the bottle was about as important as the method of hardening copper or blowing glass flowers. It's the simple stuff that's secret, boy, like lapping Jo blocks or making home brew."

"That may be so, too, but it isn't simple if you're not next to it. We once had a foreman of the plastic department that made up his own compositions. He refused to make a record of them, and they didn't dare fire him. The foreman of the varnish plant tried to sell his formulas and they let him resign, because they could buy his stuff on the open market. Now what good did it do either of them? The company finally got the dope anyway."

"I agree with you, Ed, and by the way, you have never told me just how you make that babbitt paste you gave me a hunk of. It's good stuff, and I would like to have some made up. And then there is that dope you put on ordinary paper and make it transparent just like tracing paper. Write me the formula, will you?"

"Why should I? I puzzled for years to figure those things out, and if I tell you about it, that'll be three too many people that know. I'll give you all the stuff you want, but aside from that, nay, nay. I'm not under any obligations to you or the company. The only thing you ever gave me was a cigar for that cop friend of yours the time I ran the red light."

"Yes, and I think you gave me a cigar in place of it, so your debt is all discharged as far as that is concerned. But why keep those stunts a secret? They don't help the rest of us that way. If Edison had acted that way you would have been reading by a candle now instead of a gas filled incandescent lamp."

"That's different, Al, and all your arguing won't make me change my mind. I worked like a dog to figure those things out, and if you or the company want them, they can do the same thing I did, or pay for them."

"Apropos of nothing at all, it makes a difference whose bull is gored, don't it, Ed? Well, you keep them and pass them on to Ed junior."

"Oh, by the way, Al, speaking of the boy, will you take him in your department? Both I and the wife would like awfully well to have you do it."

The old question, to whom do formulas, processes, and patents belong, is still far from settled. Some very large firms have no settled policy about patents. Does this retard development? Others pay only a nominal sum. Does this kill incentive? Others purchase desirable patents. Do they become the victims of their employees?

▸ ▸ ▸ Discussion of Former Topics

The Community Fund

Of course, the community fund idea is right. So is the idea that everyone should be a contributor. The wrong part of the idea is that the foreman is the logical salesman for it. Of all people, the foreman, as a sort of man of all work, is the poorest equipped in time or facilities to put it over. He, of all possible men, is handicapped from the start. He is doomed to individual solicitation, for the men would never accept him as a speech artist, even if he were good.

It seems to me that mass enthusiasm must be resorted to, and that facts—intimate personal ones—must be used to insure success. Either a major executive, or a man from the ranks who is honestly enthused and equipped with facts, should make the appeal. If the community fund is properly administered, and the organization is large enough to have departmental foremen, there must be some favorable fact cases involving known personal incidents that can be ascertained and quoted. One real personal sales talk, given openly to everyone, is worth all the direct solicitation foremen can offer, and requires about one tenth the aggregate time. There should be only one appeal, translatable into action at the same time and therefore best made on pay day: and there should be no duplicating home canvass.

Common sense dictates that if there is to be a minimum contribution asked for, there should be a definite maximum alternative offered as well. In no instance should personal contributions be posted—the only record that it is fair to keep is a per capita contribution in shop. Persuasion, not pressure, should be the only selling argument used. It is not fair to condemn the non-contributor unless all the facts are known—often such a man really bears a burden cheerfully that is heavier than that of some of the recipients of charity.

—Eli Smith, *Engineer,*
Russel & Company.

Boss, or Advisor?

Old hand or not, a man who tells an assistant foreman to "go to the devil" when called to order for an obvious breach of shop discipline should go. It appears that young Mason had no authority to fire Gus. He should, then, have taken other action to assert his authority, and he would have been justified in putting forward a request to the proper quarter for the firing.

If he had been given authority to fire men in the first place, it is doubtful if this occasion for so doing would have arisen. Men often need driving, but, and it is a very big but, the man who drives without giving an even break is getting perilously near bullying, which is intolerable. A man big enough for a good foreman's job will be the boss all right, but he will be big enough to "give in" to the men's point of view on justifiable occasions. Old Tom Mason hit one nail on the head, perhaps without knowing it, when he said "Show them you're better than they are;" for the one way to get and keep respect without endless "bawling out" is to demonstrate to the men that one really does know more than they do about their work, and is thus properly qualified to criticize and to issue instructions. This has a far greater effect than any amount of bluster and so-called driving, which is often a cloak for ignorance.

—C. Norman Fletcher, *Cheshire, England.*

Honest Graft

Paying overtime to assistants for attending foremen's meetings raises a rather peculiar question. Much sound logic can be found to support each side of the controversy. The meetings take time which the assistants may want to devote to some other purpose. If they are not paid for attendance they more or less sacrifice their own pursuits. Yet the men are sure of their positions, having recognized standings as valued members of the organization. As such they should be willing to attend the meetings, thus proving worthy of the confidence placed in them when they were appointed to their positions. Furthermore, the meetings have an educational value. Assistants will learn something from each one and will improve their ability. They should be ready and willing to pay a reasonable price for knowledge.

—L. O. Brown, *Toolroom Foreman,*
Holcomb & Hoke Manufacturing Company.

The Safety Court

The safety court is a good idea in theory, but in practice it would be a failure. Even the prosecutor (the safety engineer) would be the prisoner sometimes. Often when we think we have a machine thoroughly guarded, an accident happens, then we search for a way to prevent such an accident occurring again and fix up a guard immediately.

If such a case were brought into court the judge would say, "If you can put a guard on this part of the machine after an accident, you could have put one on before, and therefore I hold the safety engineer or foreman morally to blame for the accident. Only when operatives deliberately pull guards away, or have forgotten to replace them after setting up the machine, can the operative be b'amed."

—G. T. Heaton, *Engineer,*
Blackburn, England.

Vacations Again

A total shutdown of a manufacturing plant is not only feasible, but is in many cases the most economical method of arranging vacations. The plant in which I am employed began many years ago shutting down for a week in the summer. Later this was extended to ten days and subsequently to a fortnight. All this in spite of the fact that the trade is partly seasonal and that the second highest peak occurs at the time of the shutdown. This

necessitates accurate estimates on the part of the sales force, also a building up of stocks over a period of months and a reduction of stocks to zero by the end of the vacation. Naturally, the men in the shipping department have to take holidays in turn.

The weeks previous to the shutdown are a period of great activity in the engineering departments, for during these two weeks whole departments are reorganized and modernized, sometimes out of all recognition, and all preparations have to be made as far as possible in advance. The possibility of carrying through major alterations of this kind without interfering with production is in itself sufficient to justify the vacation practice.

—H. J. BURNHAM.

Vacations Again

The only way to handle the vacation problem in plants which do not have a total shut down is on the basis of seniority. This may occasionally lead to a little bother, but it is certainly the best way out.

Why the clerical force should have a vacation and not the shop men is a question which has been asked times out of number. There is no doubt that this habit is slowly passing out. Every year sees additional plants falling into the total shut-down practice, and that it benefits everyone from the head of the organization down is the general verdict.

To the physical effect of the break and to the relaxation or change of scene afforded by a vacation, must be added the mental alertness noticeable for weeks before and afterwards. The argument that this kind of break interferes with orders is answered by the fact that many of the most progressive companies have adopted it. A great point in its favor is the clear field it gives for having repairs, extensions, or improvements carried out, the men doing this work taking their vacation at some other time.

—E. MILLS.

Playing Favorites

"The greatest good for the greatest number" is a good slogan, one that Ed should observe while dealing with his men.

A good foreman should know his men and their temperaments and idiosyncrasies. Knowing these he will not attempt to make a square peg fit a round hole. He will endeavor to run his shop without playing favorites, but he will not be walked over. The man who comes to work on Monday morning with dirty overalls is, in my opinion, asking for the dirty jobs, and in my shop, other things being equal, would get them. Others, who come to work "just out of a band-box," would not be in the running for the first dirty job that came along.

—J. T. TOWLSON, *Silvertown, England.*

Government Work

After having permitted the employees to do private jobs on their own time for a number of years without seeing any objections to the practice, I was rather surprised to learn that this was a very bad practice. It may be, under some conditions, with some types of men. I can see reasons for objecting if it is necessary to have some one stay to keep the shop open or to watch the men. But with skilled, trustworthy men, who only want to use the machines and tools with which they are familiar, I cannot see any.

For example, every employee in our shop is competent to turn on main power and light switches and operate any machine or tool in the shop. It does not take the new apprentice long to reach this condition, even though it may be long before he can operate them efficiently. Every employee is given a key to the shop. That is primarily so that he will not have to wait if he is the first arrival in the morning, but he is also given permission to use it at any other time he asks.

The cost of permitting this is negligible. The power and light rate is considerably less than the main power rate, so that he must do quite heavy work to spend two cents in an evening. There is no overhead cost for supervision, rent, or other item except the wear on the machines and tools. Experience shows that the men leave the shop in as good condition as they find it. My estimate of the cost of permitting the men to do as much of their own work as they desire is about five cents per year per employee; too small an item for much consideration. We have not seen any abuse of the privilege.

—A. W. FORBES,
Forbes & Myers.

Experience or Authority?

However good a man may be, it gives him no license to "throw his weight about," nor does it entitle him to upset the rules in force in the shop. To begin with, if the term "drill-press hand" is used in America to denote the term "driller" as used over here, it means a semi-skilled man. What right has such a man to repair his own machine? If every man in the shop started to do this we might as well shut up the maintenance department. The same may be said to apply to drill grinding. The man on the job may have been on a drill-press for fifteen years, but perhaps the grinder in the toolroom has been twist-drill grinding for twenty years. The best thing to do with a man like Hacker is to fire him at once as he is merely stirring up strife in the shop.

—G. GEO. WOODCOCK, *Tottenham, England.*

Material Handling

Where I am employed we have a number of electric lift trucks for transporting material to the various departments. These electric trucks have a table 6 ft. x 3 ft. 6 in. on which material can be carried. This table can be raised and lowered about 9 in. by means of a plunger operated by the trolley's own power.

Two strong wooden trays 4 ft. x 6 ft. 6 in. are provided in each department. One for the finished article and the other for work that requires an operation. These trays are fitted with angle-iron legs that raise the tray high enough for a truck to pass under with the table lowered. The table of the truck is then raised and the tray transported to the required destination.

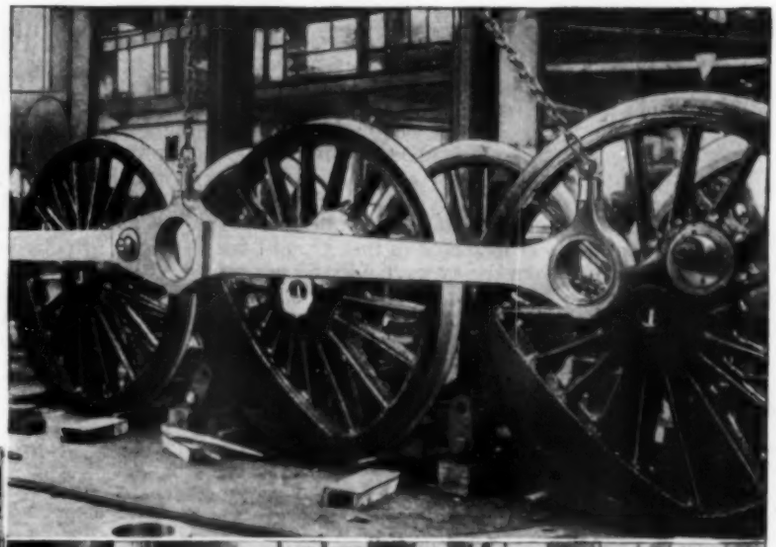
A system of so much per trip keeps handling cost to a minimum. Each truck has two men, one as driver and the other to assist in loading and unloading. The track for these trucks consists of two parallel lines, 4 ft. 6 in. apart, limewashed throughout the factory.

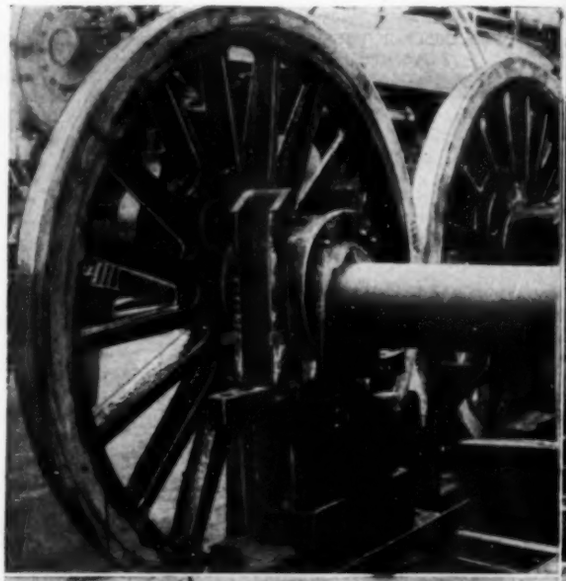
—HERBERT C. GIBLING, *Southern Railway Works, Brighton, England.*

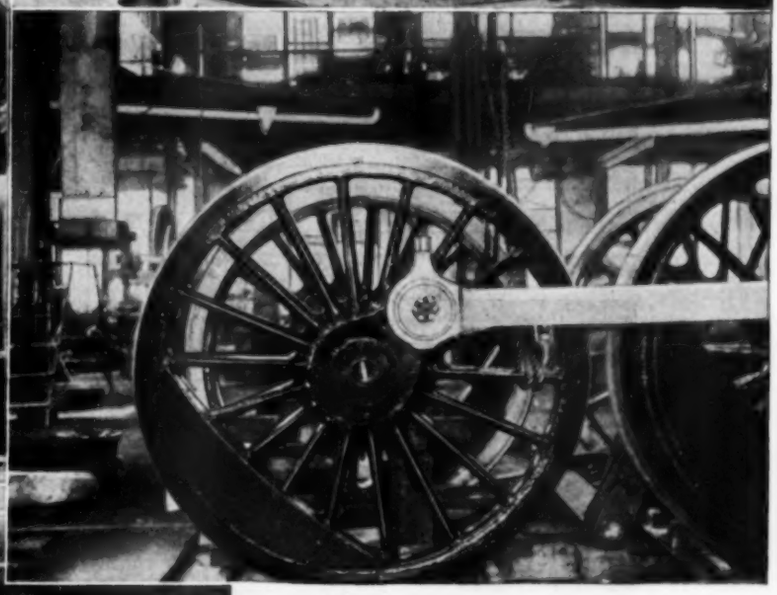
Wheeling a Locomotive in Two Hours

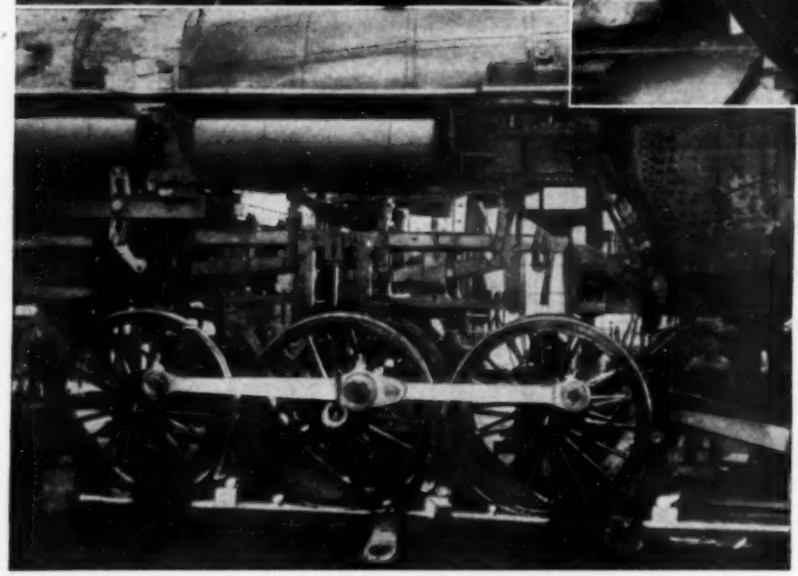
Photographs taken in the Union Pacific Shops at Omaha

WITH the three wheel sets approximately on center and pins on quarters, the side rods, handled as a unit, are placed in position. While the rods are still suspended from the chains, the floating bushings are slipped into place









Above—Tramming the wheels on centers after the side rods are assembled on the pins. The wheel sets can be readily shifted with the aid of rope and crane hook. Upper Left—Ready for the locomotive in 1½ hours. Shoes and wedges are all in place, held by wood wedges; binders are blocked up ready for bolting to the frames; and the brake rigging is approximately in position. Left—Another half hour is allowed to bring the locomotive down by crane and drop it on the wheels

AMERICAN MACHINIST 1930 INVENTORY

of Metal-Working Equipment

Report No. 7—Equipment used in textile machinery manufacture

THE PAST five years have been lean ones in the textile industry. This is reflected in the physical condition of plants engaged in the manufacture of textile machines. The 1925 American Machinist inventory showed 55 per cent of the machine tools in these plants to be over ten years of age, which was 11 points above the general average of 44 per cent for all industries reported. The current count discloses that, instead of improving, the plants represented in this group have slipped even further from the average with 62 per cent of old equipment.

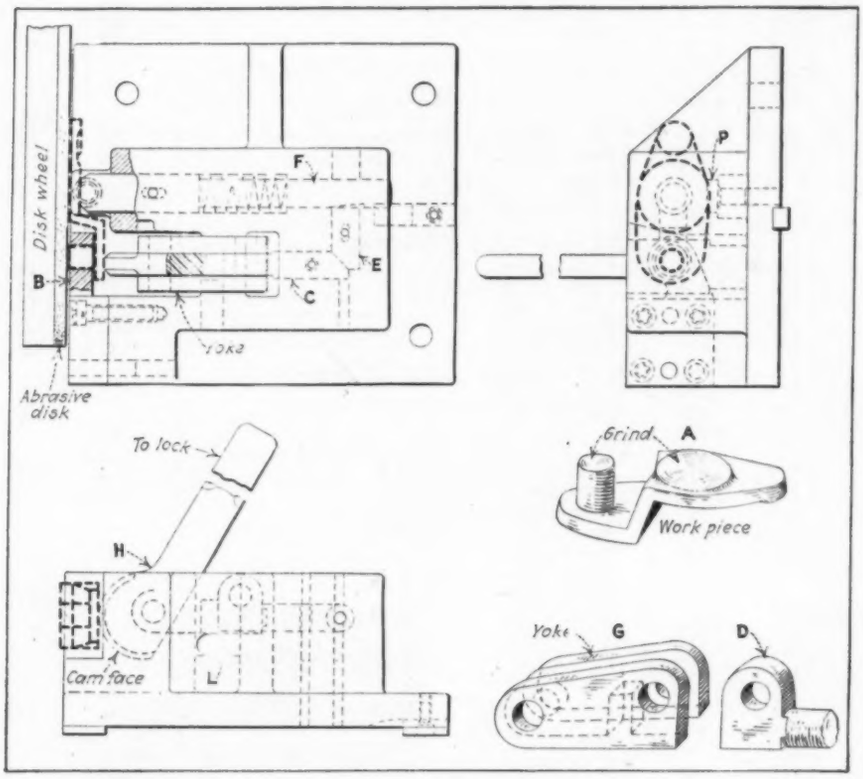
Until recent years textile machinery reflected little change in design with the result that mills were content to operate their equipment for thirty or forty years before replacement. New designs have now appeared including spooling and warping devices, single-process pickers, improved automatic box looms, more efficient finishing machines, and even new spinning methods. The mills are becoming conscious of the obsolescence factor and are receptive to new ways of processing. Undoubtedly this will in turn provide means and incentive for the makers of textile machinery to seek better equipment for their own plants.

PER CENT OF MACHINES INSTALLED
Prior to 1920
1920-1929
PER CENT OF TOTAL IN EACH MACHINE GROUP
66 32 Turning 30.2
69 31 Drilling 15.9
69 31 Milling 12.0
63 37 Grinding 11.9
8 92 Riveting 4.4
40 60 Presses, Power 4.0
50 50 Polishing, Lapping and Honing 2.9
49 51 Cutting off 2.7
52 48 Gear Cutting 2.7
75 25 Planing 2.5
69 31 Presses, Hand 2.5
43 57 Shaping 1.9
55 45 Boring 1.3
44 56 Threading 1.1
82 18 Bending and Straightening 0.9
67 33 Hammers 0.8
61 39 Shearing 0.7
29 71 Welding 0.4
55 45 Keyseating 0.4
53 47 Centering 0.4
5 95 Wire Forming 0.4
69 31 Broaching 0.3
67 33 Forging 0.1
62 38 AVERAGE

Machines in Plants Making Textile Machinery

	Total Number in Plants 1930	Number Installed Before 1920
LATHES		
Engine	26,805	21,096
Hand Turret	1,918	1,026
Power Turret	3,479	1,561
Automatic and Semi-Automatic	5,129	2,810
Chucking (Not Chucking Machines)	3,256	1,427
Speed and Bench	8,028	6,199
Crankshaft		
Toolroom Type	1,918	847
Other	5,709	3,836
CHUCKING MACHINES (Not Chucking Lathes)	2,765	1,918
SCREW MACHINES		
Hand	2,096	1,606
Automatic, Single Spindle	5,441	3,568
Automatic, Multiple Spindle	1,160	714
CENTERING MACHINES	847	446
MILLING MACHINES		
Hand (No Power Feed)	1,650	1,293
Bench	1,293	1,026
Plain (Knee and Column Type)	12,711	9,723
Universal (Knee and Column Type)	1,784	1,338
Vertical (Knee and Column Type)	1,829	1,070
Lincoln Type Manufacturing	1,739	1,338
Continuous, Rotary Table or Drum Type	847	357
Planer Type	3,256	1,249
Other	2,007	1,338
GEAR CUTTING MACHINES		
Rotary or Milling Type	4,638	2,676
Hobbing	669	268
Planing or Shaping	446	178
Other	312	45
BORING MACHINES		
Horizontal Boring, Drilling and Milling	1,204	312
Vertical Boring Mills	1,472	1,160
Other	178	178
JIG BORERS	134	
DRILLING MACHINES		
Radial	2,631	1,606
Upright, One Spindle	12,622	9,366
Upright, Two or More Spindles	5,397	3,613
Upright Gang (Two or More Heads)	1,293	847
Sensitive, One Spindle	4,995	3,523
Sensitive, Two or More Spindles	3,791	2,676
Sensitive Gang (Two or More Heads)	535	178
Two, Three and Four Way	268	178
Other	4,059	2,721
THREADING MACHINES		
Single Spindle Tapping	1,070	580
Multiple Spindle Tapping	45	45
Pipe Threading and Cutting	491	89
Bolt Threading and Cutting	312	134
Thread Chasing	134	
Thread Hobbing and Milling	223	134
Thread Rolling		
Other	134	134
PLANERS		
Open Side	758	89
Double-Housing	4,505	3,880
SHAPERS		
Vertical	401	228
Horizontal	2,810	1,293
Slotters	1,115	357
KEYSEATING MACHINES	892	491
BROACHING MACHINES	580	401
GRINDING MACHINES		
Plain Cylindrical	3,167	2,230
Universal Cylindrical	981	535
Surface, Reciprocating	2,453	937
Surface, Rotating	1,516	580
Internal	491	134
Crankshaft		
Cutter	3,167	1,338
Floor, No Feed Attachments	7,850	4,861
Bench, No Feed Attachments	2,408	758
Abrasive Disk	580	491
Abrasive Belt	178	89
Centerless	446	
Other	3,657	2,676
POLISHING AND BUFFING MACHINES (Including those in Plating and other Depts.)		
Abrasive Wheel, Hand Operated	5,218	2,854
Abrasive Belt, Hand Operated	714	401
Automatic and Semi-Automatic	401	
LAPPING MACHINES	268	45
HONING MACHINES		
CUTTING-OF MACHINES		
Parting Tool Type	758	714
Power Hack Saw	2,631	892
Rotary Cold Saw	1,115	535
Bandsaw	803	401
Other	847	491
WIRE FORMING MACHINERY		
Spring Coiling	178	
Other	624	45
WELDING AND CUTTING MACHINES		
Resistance Welding, Butt	178	134
Resistance Welding, Spot	223	
Resistance Welding, Seam		
Resistance Welding, Other		
Arc Welding		
Electric Cutting		
Gas Welding	401	134
Gas Cutting	134	
RIVETING MACHINES, STATIONARY		
Pneumatic		
Hydraulic	45	45
Power	9,946	847
PRESSES		
Punching Machines	1,739	1,204
Combined Punches and Shears	134	89
Hand, Arbor	3,568	2,899
Hand, Light Punch Press Work	669	268
Foot, Light Punch Press Work	847	357
Power, Crank Type	4,728	1,516
Power, Toggle Type	268	223
Power, Double Acting		
Power, Dieing Type		
Power, Trimming Presses	89	89
Power, Forcing, Arbor, Wheel	134	45
Hydraulic, Bending, Forming, Drawing	45	
Hydraulic, Wheel Forcing, etc.	178	89
Baling, Power and Hydraulic		
Other	1,606	1,561
BENDING AND STRAIGHTENING MACHINES		
Bending Brakes	758	580
Bending Rolls, Horizontal	401	401
Bending Rolls, Vertical		
Straightening Rolls	446	312
Other	847	357
SHEARS		
Knife	1,160	669
Rotary, Slitting	134	134
NIBBLING MACHINES	178	89
HAMMERS		
Drop	847	535
Helve	223	134
Spring	446	268
Steam		
Pneumatic (not portable)	89	45
Other	268	268
FORGING MACHINES		
Bulldozers		
Hot Forging Machines		
Cold Headers, Bolt, Nut, etc.		
Cold, Swaging		
Forging and Flanging Presses, Hydraulic		
Other Forging Machines	134	134
Total	225,096	137,594

IDEAS FROM PRACTICAL MEN



Disk-Grinding Fixture with Combination Clamp

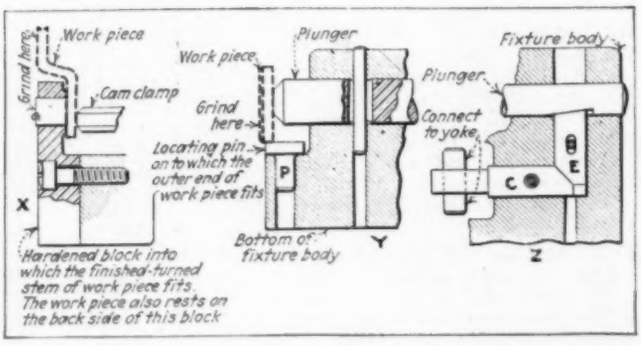
GEORGE H. FELTNER

THE GRINDING fixture design shown in the illustration includes some rather unique features that have aided in solving a rather difficult holding problem. The fixture is used for face grinding two surfaces of a small casting as shown at *A*, which is somewhat hard to hold due to its odd shape. The outstanding feature is the combination locking action that clamps the work and locks the spring plunger pin by a single cam clamp.

The diameter of the projecting stem of the workpiece is machined at a previous operation, and in loading the fixture, this stem is inserted into a hole located in the hardened block *B*. The back face of the block acts as a support for the inside face of the workpiece, as will be seen by the detailed construction shown in the section at *X*. The outer end of the workpiece is supported from its bottom edge by the locating pin *P*, which is attached to the fixture body. A sectional view of this portion of the fixture, in which the pin is attached, is shown at *Y*. In this position, the workpiece is ready to be clamped, and the cam clamp handle *H* is then forced downward in the direction indicated by the arrow. This action forces the workpiece securely against the back face of the hardened block, thus clamping it rigidly.

The outer end of the workpiece would be apt to spring away from the disk wheel during grinding if it were not supported and backed up by a spring plunger, hence the plunger pin *F* is used for this purpose. To avoid a separate locking operation for the pin, after it has seated itself against the workpiece, a pin lock that works in combination with the cam clamp handle is used.

The cam clamp handle is mounted in the fixture so that it has a slight floating action, thus causing the clamping pressure to force it backward or away from the workpiece. This pressure is transferred to the link pin *C*, shown in detail at *D*, which is made with an angular contacting face at its small end, which in turn bears against the corresponding angular face of the pin *E*. The opposite face of this pin is arranged to lock the spring plunger *F* which of course is forced against the projecting member of the workpiece by means of a helical spring. With this design, which is shown sectionally at *Z*, the workpiece is clamped and the supporting spring plunger is locked simultaneously by the cam clamp handle.



A detailed view of the clamp yoke that supports the cam lever is shown at *G*. The reason this support is made in the form of a yoke is to permit the cam clamp to be withdrawn and raised from the clamping position, and thus give sufficient clearance for the stem of the workpiece to be removed from the hardened locating block. The pin, *L*, is used to locate the yoke when it is again lowered to the clamping position.

■

Accurate Drilling of Small Holes

CHARLES KUGLER

Referring to the friendly criticisms of my article under the title given above, on page 232, Vol. 72, of *American Machinist*, W. C. Betz says, on page 813 of the same journal, "But why not have the drill-press table in

A-1 condition at all times?" I would remind Mr. Betz that the ones in authority have the say as to when machines need repairing, and any complaint made by a workman would be met with the reply, "Other men are not complaining. They get results. Why can not you do the same?"

It is the practice in some shops to spend as little as possible for repairs. The machines are used as long as possible, sometimes even longer, then scrapped and new ones bought.

On page 925, J. T. Towlson suggests that two plates and two sets of rollers be used to allow for motion in any direction. While I believe this method would give good results, it would not be as practical as using one plate with four balls or two rollers, because large work would require large plates, and they would be as easy to handle on small work as would small plates. I believe four balls or two rollers are the best for general use. They are inexpensive, take up little room, and can be kept in one's toolbox. Mr. Towlson also thinks that there are better methods available for doing this kind of work, and he does not approve of the idea of requiring a $\frac{1}{16}$-in. drill to pull the work into position.

It does seem like expecting a great deal from so small a drill, yet I have seen work weighing as much as 50 lb. drilled by the method described by me to an accuracy of 0.003 inch.

Perhaps some of the readers of the *American Machinist* can throw additional light upon this subject. What is the best and quickest method of bringing the center-punch mark immediately under the point of the drill? Bear in mind that the work is laid out by means of a height gage, center punched, and finished in the drill press.

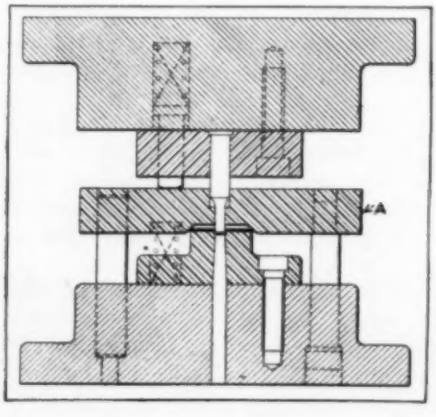
■

Centering Strip Stock in the Die

ERNEST FOLDVARY
Consulting Engineer

For piercing holes accurately in the center of a strip, many types of devices for centering the stock have been developed. However, not all of them have been entirely satisfactory.

In the illustration is shown a strip equalizer that enables holes to be punched in the center of the strip. The width of the upper surface of the die is the same as that of the strip to be pierced. The combined stripper and equalizer *A* has a bevel-edged groove in the center to suit the width of the strip, and is held up by light springs. Its alignment is insured by four leader pins pressed in the die-shoe. They are slip fits in the stripper, the vertical motion of which is limited by retainer screws.



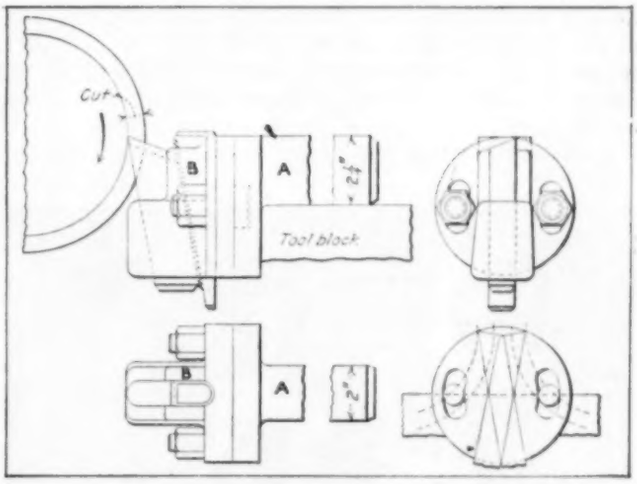
In operation, as the ram descends, the pressure pins in the punch holder press down the stripper, their heavy springs overcoming the light springs by which the stripper is held up. Before the piercing punch gets into action, the strip is centered by contact with the beveled edges of the groove in the stripper. As the ram ascends, the stripper performs its normal function, the pressure pins holding it down until the stock has been stripped from the punch.

■

A Suggested Toolholder for Tungsten-Carbide Toolbits

J. T. TOWLSON
London, England

Among the interesting things written by Frank W. Curtis, the following extract from his article, "More Chips From Tungsten-Carbide Tools" (page 608, Vol. 72, of the *American Machinist*), meets my approval in a special manner. Speaking of the likelihood of an operator deviating from recommended practice by permitting his tool to have too great an overhang,



Mr.. Curtis adds—"To overcome such a condition, a foolproof toolblock should be used, and, judging from recent experiments, a block that holds the tool vertically is to be preferred."

Following the esteemed contributor's lead, I show herewith a drawing of a suggested type of toolholder, which, if it does not quite satisfy Mr. Curtis' needs, may be a modest step toward that need.

Referring to the drawing, at *A* is the cast-steel shank of a toolholder having a stout flange at one end, recessed in its center. At *B* is the holder for the toolbit, having a pilot to fit in the recess in the flange of the shank. It is held to the flange by studs and nuts, the holes being elongated to permit it to be swung a limited amount either side of the center, in order to give side clearance to the toolbit. The toolbit is serrated on the back and is held in place by a serrated wedge. While the toolbit is abnormally large, considering the cost of tungsten-carbide alloy, allowance should be made for the usability of its greater portion before the remainder is put aside for other purposes.

The method of gripping the toolbit is a good one, and yet permits its easy removal. While the serrations in both the toolbit and the wedge hold the bit super-rigidly, they permit easy adjustment of its height. At *C* is a

diagram indicating how the holder can be swiveled on the shank to give the toolbit side clearance in either direction. It will be seen that the rigidity of the holder on the shank does not entirely depend upon the tightness of the grip of the studs and the nuts, but is augmented by the support given by the flanges of both parts, the studs acting as a fulcrum.

It is suggested that various ideas for chip breaking may be adapted to the device.

■

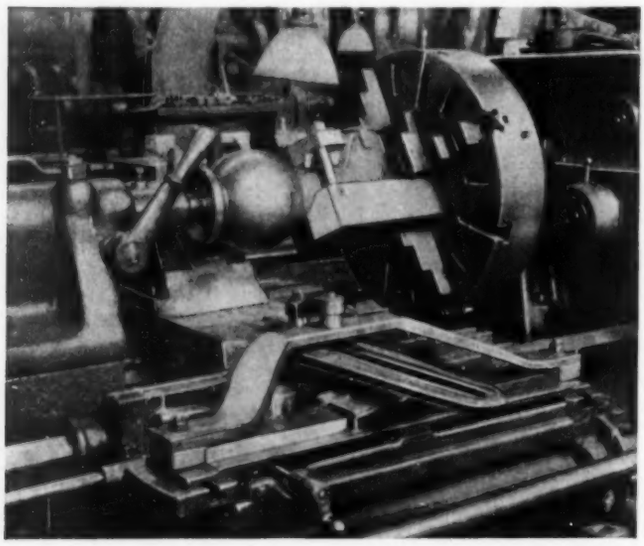
Convexities and Concavities—*Discussion*

O. J. FRANKLIN

A method of spherical turning in use at the Silvis, Ill., shops of the Chicago, Rock Island & Pacific Railway Company, is illustrated in the accompanying photograph. The device is shown turning a convex brass ball joint used in the steam connection of a locomotive booster; it can also be used for the concave mating member.

The device, which is applied to an engine lathe, consists of a forged steel bar which is bolted to the taper turning attachment and a forged link connecting the bar to the slotted extension of the cross-slide. In this particular set-up, the link has the pin holes drilled on 3½-in. centers to turn a 7-in. ball, although links of other sizes can be used.

To hold the elbow end of the brass casting, a special



chuck was made. The body is cut out of a solid block of machinery steel to form a V for the cylindrical portion of the neck. A similar V is cut in the clamp bar, which is made from vanadium steel, heat-treated. Additional support is given the piece through the tailstock to which has been applied a special center carrying a cone which slips into the open end of the ball.

A forged tool with a rounded nose is used in the tool post. In setting up the device, the carriage and taper attachment are shifted until the tool is on the center of the ball. The link, of course, should be at right angles to the ways of the machine when the tool is on center, and it is then necessary to lock the taper attachment in position and to release the cross-feed screw of the carriage, allowing the link to control the path of the tool.

SEEN AND HEARD

●

Wabbly Tail Centers

DESIGNERS, along with the rest of us, are too apt to look at a portion of the problem only, and overlook some of the important points. A recent case is that of another ball bearing tail center for a lathe. The designer provides a good-sized center and mounts it in two ball bearings, one of these having a double row of balls. The whole is inclosed in substantial housing, and would be a good job if it were to go inside the tail spindle. But, probably because he has always seen a tail center stuck in the end of a tail spindle, he uses a small taper shank to hold the whole thing, and ruins an otherwise good design.

With any kind of a cut that would require a ball bearing center, this thing sticks out so far it would wave around like a reed in the wind. I'd prefer a short, stiff plain center to this, and yet it would be fine if properly mounted. But the place for it is inside the tail spindle, not sticking out into the cold world like an afterthought.

Adaptability in Grinding

ADAPTABILITY is one of the greatest assets a designer can have. Fixed ideas in any field hold one in very narrow paths. A recent example of adaptability was the use of a centerless grinding machine for a second operation where the portion ground last had to be concentric with the first. The first part ground was run in V's, and the work was driven by a rubber covered wheel to take care of any eccentricity of the second part. Strictly speaking, work floats, or centers itself, in a centerless grinder, but this adaptation makes it possible to avoid centers in the first part and keeps the machine equipment more uniform. If the engineer had been strictly orthodox on the subject, final costs would have been much higher.

High Prices for Airplane Engine Parts

THOSE OF US who remember the early days of the automobile recall the exorbitant prices charged for tools and accessories. An ordinary screw or monkey wrench became a precision tool when wanted for an automobile, at least so far as the price asked was concerned. An automobile cap cost twice as much as a similar cap for any other purpose.

And now the airplane is paying the price of newness in much the same way. One engine builder tells us that parts makers discriminate against the airplane industry. He claims that a piston pin, for example, costs several times as much when it becomes known that it is for an airplane engine.

The parts makers will probably fall back on the alibi of quantity ordered, which may or may not be a valid reason. If the designer can incorporate piston pins and the like from existing automobile standards this difficulty should disappear. —*J. R. G.*

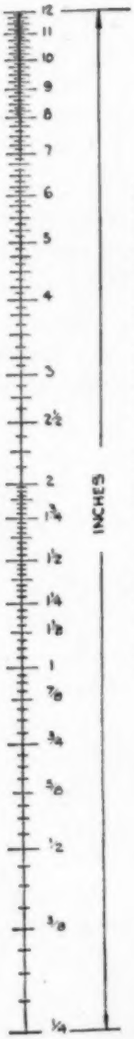
Steel Calculating Chart

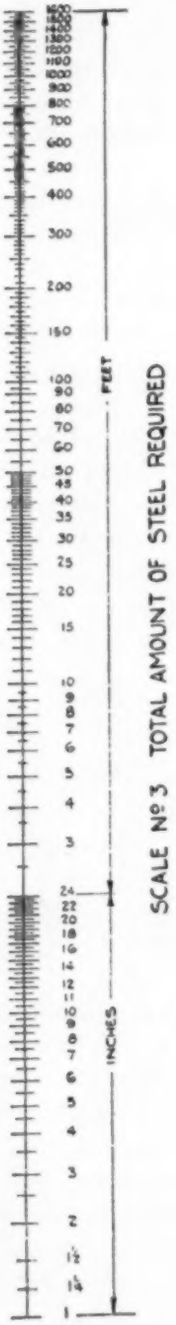
STEEL CALCULATING CHART INSTRUCTIONS

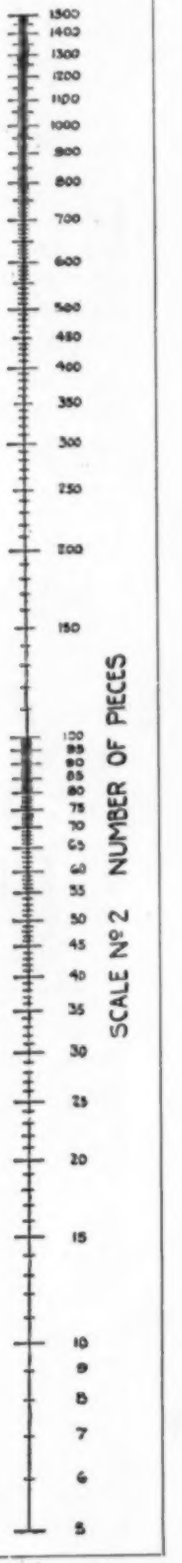
Place one end of straight edge on scale No. 1 at the figure corresponding to actual length of each piece, the other on scale No. 2 at the figure corresponding to the desired number of pieces. The total length of steel required will be found where the straight edge crosses scale No. 3.

To make allowance for cut off, add the cut off allowance to the actual length of the finished piece when locating on scale No. 1

To add an additional percentage to the total amount of steel required, increase the number of pieces to the desired percentage when locating on scale No. 2.







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Machines and Securities

LAST SUMMER'S hysteria of stock speculation has given way to a sounder appraisal of security values. Tips, hunches, the other fellow's guess are no longer in vogue as determinants of investment soundness. The desire for exact information is manifest. What are the earnings? How much does it yield? These are questions being asked by security buyers today.

Behind securities lie the productive units of industry, the machines. What is more logical then than to apply a businesslike yardstick to plant equipment? A machine's mechanical value is its cost less depreciation—its commercial value is derived from its ability to earn. A recent article on selling obsolescence, by Allen W. Rucker in "Class & Industrial Marketing," points out that a machine costing $12,000 and earning a net profit of six per cent has a commercial value equivalent to its mechanical value. If it earns only three per cent, its commercial value is halved—if it earns ten per cent, its commercial value is $20,000.

A machine is serviceable mechanically as long as it turns out work to specification. But it is of value commercially only as long as no other machine will earn a greater profit. The manufacturer who retains equipment that fails to meet this test actually pays for improved machines through increased unit costs without securing the advantages of ownership.

Much of the prevalence of obsolete equipment may be attributed to a confused conception of value. Too often an exact measure of earning power is entirely neglected. Many manufacturers think in terms of machines and are impressed with mechanical worth alone. It goes against their grain to scrap smooth-running gears and truly turned bearings. But true and smooth though it may be, any machinery which does not meet a commercial standard of evaluation is an insidious deterrent to profits, and should be replaced at the first opportunity.

Organized Safety Has Progressed

PLANS recently announced for the 19th Annual Safety Congress to be held in Pittsburgh, September 29 to October 3, recall to mind how young is organized safety. Nearly one-third of the total membership of the National Safety Council is composed of plants in the metal industries, and the history of the three sections involved—metal, automotive, and power press—is closely interwoven with the history of co-operative safety work in the United States.

It was a small group of safety pioneers, mostly in the steel industry, who originally organized the Council in 1913. In 1916 the Iron and Steel Section, now known as the Metals Section, was formed. Today this section officially represents eight hundred foundries, steel plants, and other companies, employing over a million workers. As originally organized, the Metals Section included all types of metal work. It soon found, however, that its activities were too diversified, and as a result, in 1917 companies specializing in machine shop, stamping, and forging activities formed their own section, now known as the Automotive Section. This group has grown until today approximately five hundred and seventy-five organizations, with a total of eight hundred and fifty thousand employees, are now co-operating in accident prevention work. A further subdivision was made in 1926 of member companies who specialized in lighter operations such as sheet steel work, stamping, forging, and wire manufacturing. This group, known as the Power Press Section, today has about three hundred and seventy-five co-operating members, employing about eight hundred and fifty thousand workers.

Growth in membership, from year to year, has been encouraging, the present rate being about fifteen per cent. It is interesting to note that practically all companies employing over one thousand men are members of the Council, but strangely enough a large portion of the remainder is represented in rather small plants. Better representation among medium size plants is the goal.

Here is a co-operative enterprise run on a non-profit basis that is not only saving member companies money, but lives as well. One large group of steel manufacturers, for example, has been able to reduce accidents ninety per cent. May this record be maintained and may the organized safety movement gain new adherents.

SHOP EQUIPMENT NEWS

Bliss Double-Crank Press with Adjustable Bed

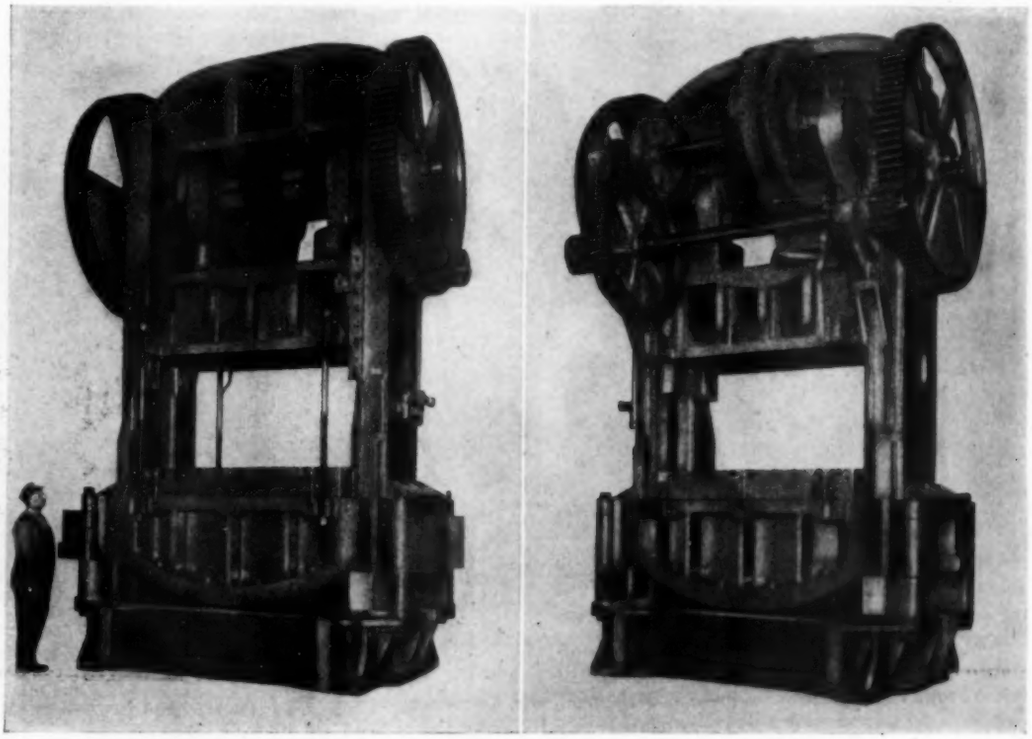
Three design improvements are apparent in the double-crank press with adjustable bed announced by the E. W. Bliss Company, 53rd St. and 2nd Ave., Brooklyn, N. Y. These are an adjustable bed with supporting blocks and the use of the main drive to set the bed, a slide with a self-contained screw adjustment, a breaker safety device, and "solid connections," and a friction clutch drive without outboard wheels or brackets.

The bed is gibbed to the uprights and supported on a system of blocks. It may be raised by connecting it to the slide through four long bolts in the open lugs at the corners. The main clutch is then used to move it. If upward movement is desired, the shaft is turned to bottom center, the bolts tightened evenly, and the gibs slacked, after which the shaft is turned to top center, thus raising the bed a distance equal to the stroke. As many blocks as will go are then swung in to support the bed temporarily, and the shaft returned to the bottom center for another lift. In the press shown, three such lifts are necessary for the full movement. When the bed is at a height within one block's thickness of the desired position, the slide adjustment is used for the final setting.

Of course, this method of adjustment lacks some of the convenience of a press with four, motor-driven bed-adjusting screws, but the support is improved, and the absence of machinery in the foundation pit will commend itself to the die setter and repair man. In many shops the bed adjustment may be used only at rare intervals, and consequently the low price of such construction is an attractive feature. In addition to the improved rigidity afforded by the block supports, they offer a positive and non-wearing means of keeping the bed level and parallel to the slide, while the screw-controlled bed may present difficulties in this respect.

Ordinarily, the adjustable connection of large presses is the weak spot, because overloads or failure to lock the screws securely result in bent screws or split straps. The press illustrated has one piece, non-adjustable connections. Adjustment is made by a screw below the wrist. The wrist sockets have cylindrical exteriors, which are slidable in bored guides in the slide. The screws are extensions of the wrist socket and are fitted with long bronze nuts geared to an adjusting motor. Since these screws are true compression members, they are stronger than the ordinary connection. Locking is accomplished by a worm shaft at each end of the slide, which actuates a check nut. The latter is so arranged that it brings the pressure areas of the screw and main nut firmly together.

Under the main nut is provided a space for the insertion of a safety washer. Collapse of this washer relieves the slide about $\frac{1}{8}$ in., which is sufficient to prevent damage when a double or over thick piece is put in the dies. To replace the safety washer, it is necessary only to move the slide down until the end of the screw clears the washer, which then



Features of the Bliss Double-Crank Press shown are an adjustable bed with supporting block and the use of the main drive to set the bed; a slide with self-contained screw adjustment, a breaker safety device, and "solid connections"; and a friction clutch drive without outboard wheels or brackets

may be removed and a new one inserted through an opening in the upright.

A motor on the crown is connected to the flywheel through a Texrope drive. The short centers permissible with this drive make it feasible to place the flywheel inside the back brackets. As a result, a neat compact arrangement is obtained with an overall width not exceeding the length of the crankshaft. The clutch is built in the flywheel and the brake is separated from the clutch. Both flywheel and shaft are on Timken bearings. Another feature is that the driving shaft is short and needs but two bearings as compared with the three-bearing mounting employed where the flywheel is outside of the frame.

Niles 90-Inch Quartering and Crankpin Turning Machine

On the 90-in. quartering and crankpin turning machine developed by The Niles Tool Works Company, Hamilton, Ohio, both heads will turn crankpins or quarter simultaneously, or either head will turn crankpins while the other head is quartering. It is essentially a one-man machine, both in its operation and the handling of the wheel set in and out. All operating levers are within convenient reach of the operator. Direct vision of the work is another feature. A combination helical and V-belt drive and worm and gear feed afford a smooth finish.

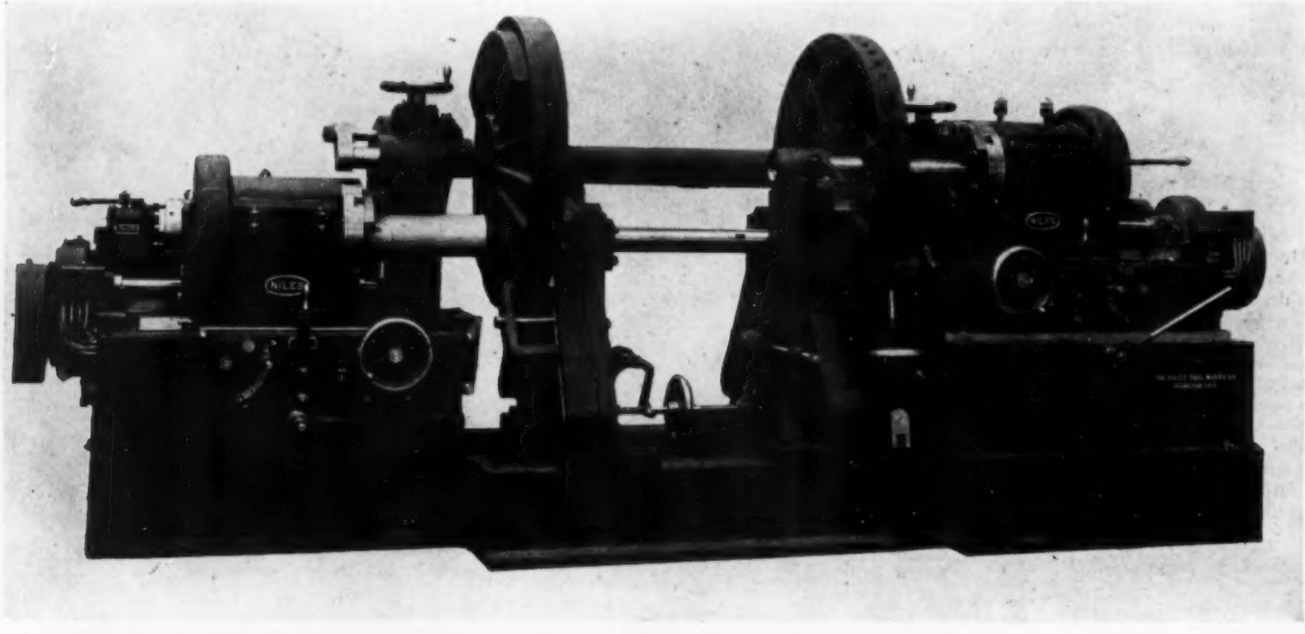
The machine is so designed that when the wheel set is in position, the right crankpin or crankpin hole on right lead engines (when facing the machine), is on the front center and the left crankpin is on the bottom quarter. Setting up the wheel set in the machine in this position provides low center of working gravity, and is instrumental in gaining rigidity and allowing convenience in vision and working height of the operating mechanism. Wheel sets are held in the machine on large hardened steel centers traversed easily to the work by means of a handwheel and gearing.

The right-hand head is movable out and in for stroke position and the left-hand head is movable up and down for stroke position. Each unit consists of a substantial sub-base, box turning head, drive, and feed mechanism. Both heads are bronze gibbed to hardened and ground steel V-ways on the sub-base. The slides on the head are also fitted with thick hardened and ground mating plates. Feed is through a worm and gear, and is provided with a safety clutch. At the outer end of the box chuck is a large helical ring gear driven by a helical drive pinion mounted on the main drive shaft. The pinion moves integral with the head and slides on a double spline in the drive shaft. The unit is movable in and out (for stroke setting) on a base bolted to the bed. It is guided by two slides, one near each end. This unit is set for stroke position by hardened and ground blocks. Large bolts at each corner lock the unit rigidly in position.

Up and down movement of the left-hand unit is obtained through two large coarse pitch screws operated simultaneously by one lever through gearing. End thrusts on all screws are taken by ball bearings and all moving parts are oiled by a centralized system.

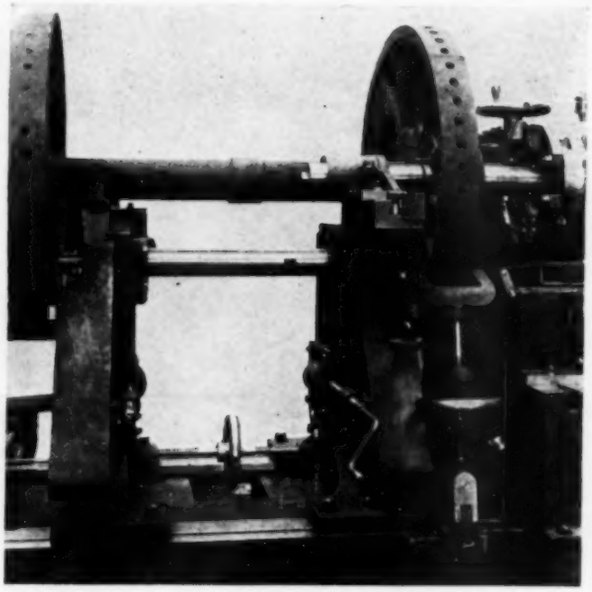
Each head is provided with hand and power traverse for both directions. One feed change lever provides two changes of feeds, namely, $\frac{1}{16}$ and $\frac{1}{32}$ in. The feed and traverse movements are interlocked for safety.

On the inner face of the box chuck are two parallel T-slots, which receive the two toolholder brackets for the cutting tools and burnishing rollers. These brackets have in and out



Front view of the Niles 90-Inch Quartering and Crankpin Turning Machine, showing the left head set up for crankpin turning and the right-hand head set up for quartering

adjustment in the T-slots and the toolholders have in and out movement. The boring bars for quartering are made up of three pieces, namely, the socket bolted to the outer end of the box chuck, the boring bar itself, and the pilot bar. Both the boring bar and the pilot bar are held in their respective sockets by a taper and draw bolt. This bar has been made hollow to reduce its weight. The boring bar has an inboard bearing, which is necessary for accurate work. The bearing is set for stroke position by hardened and ground blocks similar to those used for setting the head units. When the machine is changed from quartering to crankpin turning, the pilot bars are removed and stored. Then the boring bars are knocked loose, passed through into the inboard bearing, and there retained until again needed. No other parts of the machine are disturbed.



Close-up showing the massive V-supports with worm and gear elevating adjustment and hand adjustment for setting the wheel in the quarter position

The center supports are massive castings bolted to the sub-base. The spindles are 3½ in. in diameter. The V-blocks that are run up against the journals have a vertical movement sufficient to take care of journals from 8 to 14 in. in diameter. Each V-block has independent vertical movement through worm and gear by a crank wrench. The supports have a lateral movement on the bed so that they can be brought up against the inner face of the tires for rigid clamping of the wheel set. Lateral movement is obtained through a small handwheel on a light coarse pitch screw located close to the base of the supports. Each support carries the bracket that holds the inboard bearing for the boring bar. A handwheel draw rod is provided at the front of the machine which, when clamped to the wheel set, provides a ready means for setting the wheel set in the quarter position.

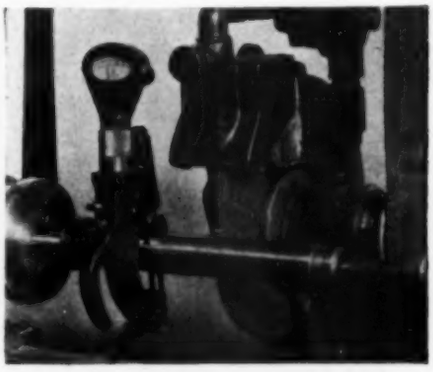
The motor is mounted on a separate base behind the head unit and is directly connected to a speedbox having one mechanical speed change. This drive unit does not move with the head unit and, consequently, requires a driving means that must accommodate itself to the different center changes. On the gearbox driven shaft is a helical pinion driving a helical drive gear. On the helical driven gear shaft is a grooved pulley driving a series of V-belts to a like pulley transmitting rotation to the main drive and feed shaft. The pulleys are held on fixed centers by a distance link. When the head unit is moved for stroke position, the change in center position is taken up by the driving gear at the speedbox swiveling around the drive pinion. The distance link is made adjustable, providing a means for tightening the belts. The drive motor recommended is either a 3 to 1 d.c. motor, 500 to 1,500 r.p.m., providing speeds from 5 to 36 r.p.m., or a multi-speed a.c. motor giving 600, 900, 1,200, and 1,800 r.p.m., providing eight speeds from 6 to 43 r.p.m.

Specifications: capacity of machine, 90 in.; maximum distance between centers, 6 ft. 2½ in.; size crankpin turned, 12x24 in.; boring bar travel, 13½ in.; minimum and maximum stroke setting, 12 to 18 in.; diameter boring bars furnished, 3½ and 4½ in.; feeds, $\frac{1}{32}$ and $\frac{1}{16}$ in.; recommended speeds, 5 to 35 r.p.m.; length over-all, 18 ft., and height and width, determined by largest wheel set to be handled.

Krupp Mikrotast Portable Grinding Gage

Gaging cylindrical work on the grinding machine can be carried out without stopping the machine by means of the portable Krupp Milkrotast grinding gage shown. This gage, introduced into the United States by the Coats Machine Tool Company, Inc., 110-112 W. 40th St., New York, N. Y., has contact points of non-wearing Krupp "Widia" metal to offset the abrasive action of the rotating work. Thumb-pressure on the lever will raise the V-shaped upper jaw, which is then snapped on the work and held there by means of this jaw and the adjustable support, which rests against the bed of the machine. The adjustable support must be set so that the gage clears the grinding wheel cover. An important feature of this gage is that it can be removed easily from one machine and used instantly on another.

When grinding work to a master spindle, the gage is set to the master and adjusted in such a way that the



Gaging work while the machine is running by means of the Krupp Mikrotast Portable Grinding Gage

indicating hand starts close to the right scale extremity. If the gage is then placed on spindles which are yet to be ground, the indicating pointer will stand at the left scale extremity. Pointer movement to the right, of course, signifies smaller diameters.

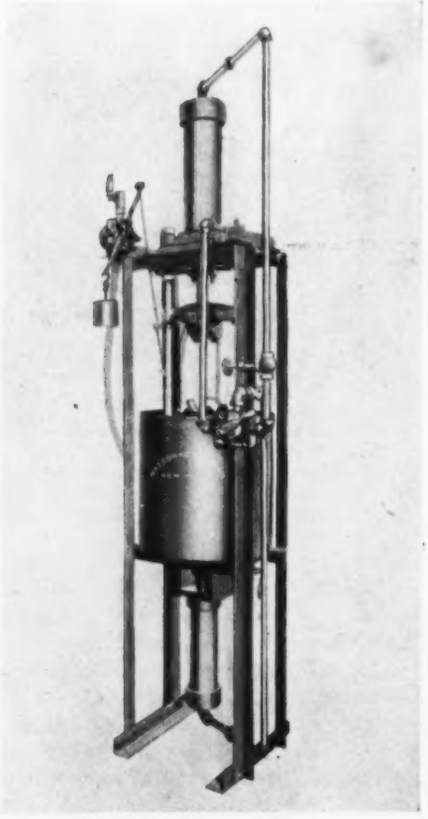
The fan-shaped, knife-edge-operated Mikrostat indicator is graduated in 50 divisions of either 0.0001 in., 0.0002 in., 0.0005 in., or 0.001 in. The gage is made in five sizes, covering the range from 1¼ to 8 in. The

model shown has a capacity from 1¼ to 2 in., using two interchangeable lower anvils, one to cover the range from 1¼ to 1⅝ in., and the other from 1⅝ to 2 in.

Watson-Stillman Testing Machine for Brass Fittings

Testing of brass fittings at a speed of 500 to 600 per hour can be effected on the testing machine developed by the Watson-Stillman Company, 75 West St., New York, N. Y. It can also be used for testing fittings of other materials, such as malleable iron, cast iron, and cast steel. All fittings, 90-deg. to 45-deg. elbows, street elbows, tees, crosses, and return bends, in sizes up to 1½ in. can be tested at an air pressure of 50 lb. per sq.in. under water with a 90 lb. operating pressure. The fittings can be tested either before or after tapping.

In operation, the fitting to be tested is placed in a die on the lower platen. The valve at the right of the press controls the top double-acting piston, which, on its down stroke, clamps the fitting in the dies and forces it under water in the tank. Air pressure is turned on automatically by the valve at the left on top of the frame. Reversing the valve at the right returns the top piston to the loading position, while the bottom piston lifts the fitting out of the water and releases the air pressure in the fitting. The tested fitting is then removed and the machine is ready for the next test.



Brass, malleable-iron, cast-iron, and cast-steel fittings can be tested at the rate of 500 to 600 per hour on the Watson-Stillman Testing Machine

"Bristo" Setscrews and Capscrews with Dardelet Thread

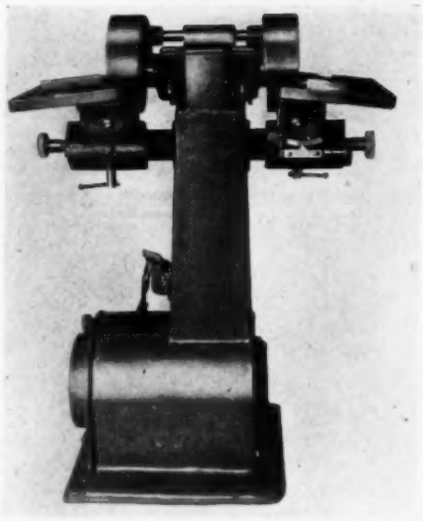
The Bristol Company, Waterbury, Conn., has announced the adoption of the Dardelet screw thread as optional on "Bristo" hollow safety setscrews and socket head capscrews. All standard sizes of setscrews and capscrews are available with the thread, but not all the extra small diameters of setscrews.

The Dardelet screw thread approximates that of the Acme, but the space between the teeth is wider and is inclined away from the start of the thread. The inclined surfaces at the bottom of the external thread and the tops of the teeth of the internal thread wedge together along the inclined plane and are held by friction when the nut is seated.

Oliver Tungsten-Carbide Tool Grinder

A duplex grinder, mounting two 9-in. cup wheels with 2 in. face, has been announced by the Oliver Instrument Company, Adrian, Mich. Drive to the spindle is from a 1-hp. motor in the base of the pedestal. The double unit permits complete grinding of a tool on one machine without the necessity of changing grinding wheels.

Grinding is done free hand, the tool being held against the protractor at the proper angle. The protractor furnished is graduated up to 50 deg. either side of center. Since the motor control is of the push-button magnetic type with overload and undervoltage protection arranged for start, reverse or stop operation, the grinding wheels can be run in either direction for grinding right- or left-hand tools.



Oliver Duplex Tungsten-Carbide Tool Grinder having independent tables and protractors adjustable for any tool angle

The spindle is of special heat-treated steel and runs in bronze bearings adjustable for wear. Lubrication of the bearings is effected from oil wells by means of wicks. The grinder is equipped with an adjustable table for each wheel. A guide slot parallel to the wheel face and a protractor sliding in the slot are provided on the top of each table. A diamond wheel dresser also slides in the slot and assures the wheel face being parallel always with the tool guide. Tilting of the tables to 25 deg. is arranged for.

When shipped, the machine is ready for operation. It includes the motor, grinding wheels, protractor, diamond dresser, belt, and starting switch. The weight is 600 lb.

"Wyr-Omat-Ick" Wedge-lock for Shipping Purposes

Manufacturers who have experienced difficulties and loss through improper packing of their products will

be glad to learn of the "Wyr-Omat-Ick" wedgelock, developed by the Wyrick Engineering Company, Wyandotte, Mich. This wedgelock prevents the products from shifting within the packing case, box or other container, when it is rammed, jolted

Fig. 1—"Wyr-Omat-Ick" Wedgelock which has an internal spring, causing the two parts to increase the height and thus wedge between the article and the container

or subjected to impact in shipment. The device is made up of two wedge-shaped blocks which slide on their inclined faces as shown in Fig. 1. A tension spring in a slot between these faces tends to slide one block up on the other. When the wedgelock is used for packing purposes, the ends of the wedgelock are forced together by hand, and the wedgelock inserted in the space, and the pressure on the two parts released. It then automatically expands to make a snug fit between the article and the container,

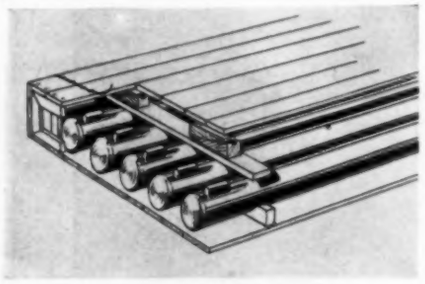


Fig. 2—Method of packing boring bars by means of the "Wyr-Omat-Ick" Wedgelock to prevent shifting and damage

and will not work loose or drop out of its original position. It thus effectively prevents shifting and bumping, which are to be eliminated in the packing of special tools, such as the boring bars shown in Fig. 2.

The "Wyr-Omat-Ick" wedgelock is made in nominal thicknesses of $\frac{3}{4}$ to $3\frac{5}{8}$ in., and in lengths from 2 to 10 in. With open crates locks may be placed after the nailing slats have been nailed on.

Bignall & Keeler Improved No. 8 Duplex Pipe Threading and Cutting-Off Machine

Cutting and threading pipe and casing from $2\frac{1}{2}$ to $8\frac{1}{4}$ in. can be done on the No. 8 duplex machine of improved design announced by the Bignall & Keeler Machine Works of the N. O. Nelson Manufacturing Company, Edwardsville, Ill. This machine is equipped with a Peerless sliding diehead with expanding dies. Screw adjustment is provided for accurate setting of the dies to proper size, and a positive locking arrangement takes all strain from the adjusting screw.

The heavy bed casting rests directly on the foundation and is strongly braced. It has suitable provision for mounting working parts of the machine. The lower half of the gearbox is a part of this bed casting. Eight speed changes are provided through broad face cut steel gears, running in oil in a compact gearbox. A two-way positive clutch is mounted on the bed shaft and has both fast and slow positions. It provides a quick stop and start for the machine, and also enables the operator to shift quickly to the higher speeds for cutting off the large pipe sizes. Power is transmitted to the revolving parts from below.

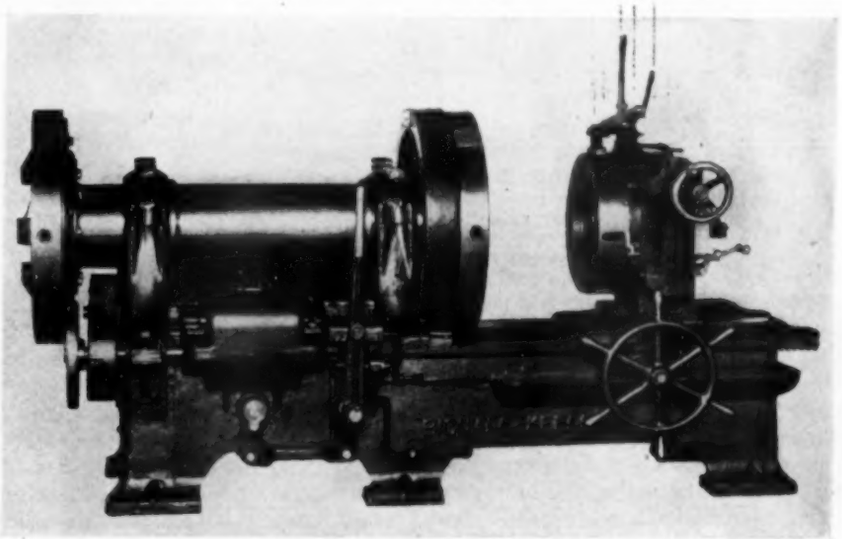
A three-jaw independent chuck is mounted on each end of the arbor, each jaw having a tempered tool steel gripper which can be removed readily for sharpening. The rear chuck has special flange grippers, which are convenient in making up flanged fittings.

The diehead slides to one side for changing dies and when putting collars through to the cut-off tool. The head can be arranged for extra-wide dies either $3\frac{7}{16}$ in. or $4\frac{7}{16}$ in. wide. Ample power is provided for cutting long tapered threads to the A.P.I. or any other standard at one pass.

The machine is furnished with a geared oil pump and is equipped with motor for any available current, or may be arranged for belt drive. Floor space occupied is 57 x 110 in. The spindle has a 10-in. hole right through, and a carriage travel of 20 in. The power required is 5 hp. and the weight is 7,500 lb.

Reliance Large Fan-Cooled Motors

By employing the Mossay principle of cooling to large, inclosed, fan-cooled motors, the Reliance Electric & Engineering Company, 1088 Ivanhoe Road, Cleveland, Ohio, can supply motors up to 150 hp., interchangeable in mounting dimensions



Bignall & Keeler No. 8 Duplex Improved Pipe Threading and Cutting-Off Machine, which has capacity for $2\frac{1}{2}$ to $8\frac{1}{4}$-in. pipe and A.P.I. casing

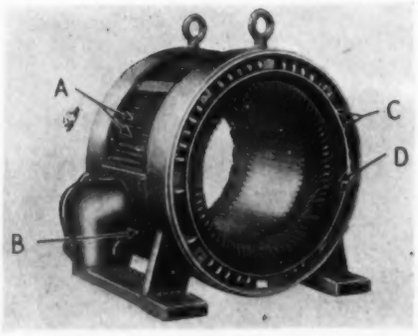


Fig. 1—Stator of Reliance Large Fan-Cooled Motor, showing tubes for radiating heat from confined air to air steam from fan

with standard open motors of the same horsepower and speed rating. This method of cooling is employed on motors above 20 hp. because the design of smaller motors does not provide sufficient cooling area.

The extra cooling area obtained with this principle is obtained by the use of tubes *A*, Fig. 1, extending over the outside of the stator. A single internal fan on the rotor circulates the confined warm air through the tubes. A steel enclosing band *B* forces the cool air to follow along the outside of the tubes from one end of the motor to the other. Legs of the tubes are welded into the inside header, as at *C*, forming a dust-tight joint. The warm confined air enters the cooling tubes through openings *D* and returns to the inside of the motor at the opposite end. Stator windings and rotor are tightly enclosed and all seals are stationary. In dismantling the motor the only extra parts to remove in addition to those of the standard open motor are the external fan guard and fan.

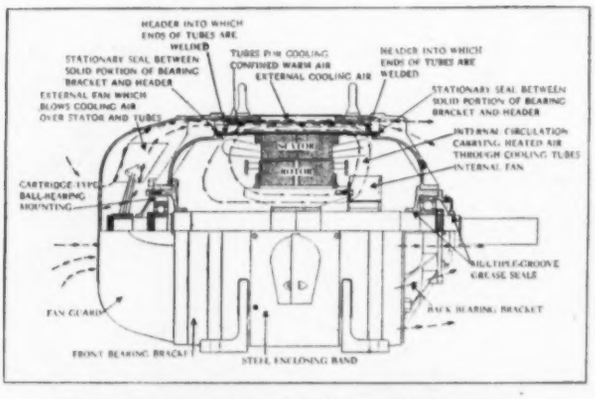
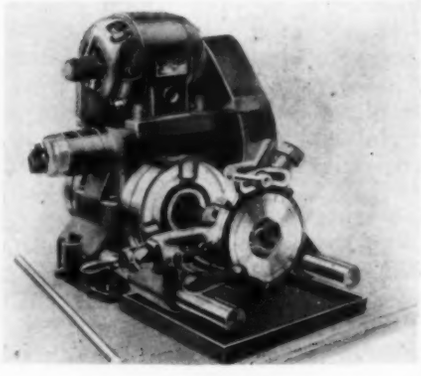

HEADER INTO WHICH ENDS OF TUBES ARE WELDED
STATIONARY SEAL BETWEEN SOLID PORTION OF BEARING BRACKET AND HEADER
EXTERNAL FAN WHICH BLOWS COOLING AIR OVER STATOR AND TUBES
TUBES FOR COOLING CONFINED WARM AIR
EXTERNAL COOLING AIR
HEADER INTO WHICH ENDS OF TUBES ARE WELDED
STATIONARY SEAL BETWEEN SOLID PORTION OF BEARING BRACKET AND HEADER
INTERNAL CIRCULATION CARRYING HEATED AIR THROUGH COOLING TUBES
INTERNAL FAN
CARTRIDGE TYPE BALL-BEARING MOUNTING
MULTIPLE-GROOVE GREASE SEALS
FAN GUARD
REAR BEARING BRACKET
FRONT BEARING BRACKET
STEEL ENCLOSING BAND

Fig. 2—Cross-section of Reliance Enclosed Fan-Cooled Motors in sizes from 20 to 150 hp., and employing the Mossay principle of cooling

"Tom Thumb" Pipe Threading Machine

What is claimed to be the smallest, complete pipe machine has just been placed on the market by The Oster Manufacturing Company, Cleveland, Ohio, and The Williams Tool Corporation, Erie, Pa., in the form of the "Tom Thumb" pipe machine. Although the machine will cut-off, thread, ream and chamfer all sizes from ¼- to 1¼-in. pipe, its over-all dimensions are only 18½ in. in height, 16 in. in width, and 23½ in. in depth. The ½-hp. "Domestic" universal motor automatically adjusts its speed to the pull on the dies. According to the manufacturers, test results show that the machine will put a standard thread on a 1¼-in. pipe in 18 seconds, and on a ¼-in. pipe in 12 seconds. The actual floor-to-floor time, including chucking, threading, reaming, cutting-off, and removing 1¼-in. pipe from the machine is only one minute and 17 seconds, a much faster speed than can be obtained by hand.

A special bolt chuck has been designed for use with the machine, which makes it possible to thread bolts from ⅜ to 1½ in. It is claimed the machine is quiet and smooth in operation, the power being transmitted by a double V-belt. Timken roller bearings are used throughout. The "Tom Thumb" is equipped with a cutting-off and reaming attachment, and a reversible snap switch.



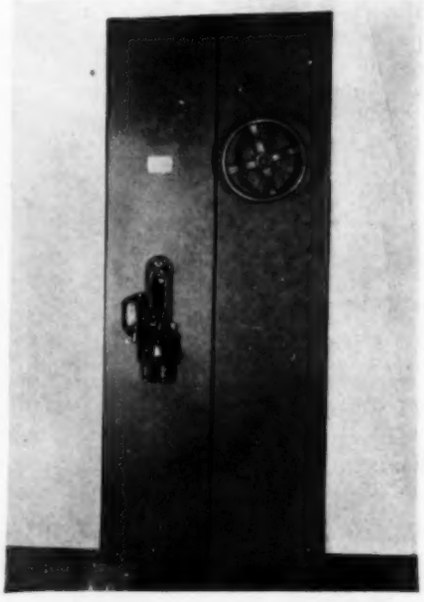
"Tom Thumb" Pipe Threading Machine, which will cut from ¼- to 1¼-in. pipe and thread ⅜- to 1½-in. bolts by means of a special bolt chuck

Westinghouse Starters for Wound-Rotor Motors

For use where it is desired to have the complete control of the primary and the secondary of a wound-rotor induction motor in a single compact unit, the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has developed the class 12-600 control panels, a line of manually operated non-reversing starters and speed regulators.

These control panels are used with motors driving pumps, fans, and similar applications where the infrequency of operation makes manual control desirable.

The motor is started by closing the primary oil circuit-breaker with all the resistance in the secondary circuit. The secondary drum is then gradually rotated through its successive contact positions, each movement of the drum short-circuiting a portion of the resistor, thus allowing the motor to accelerate. The drum is finally moved either to the "run" position or to some speed position, depending



Front view of Westinghouse Class 12-600 Manual Type Starter and Speed Regulator

upon whether the duty is for starting or for speed regulation.

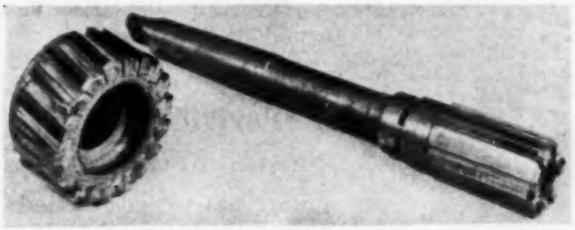
The motor is stopped by returning the drum to the "off" position, by tripping the primary breaker, or by the use of a stop push button station in series with the undervoltage trip of the primary breaker. In all cases the drum must be returned to the "off" position before the motor can be started.

The dead front sheet steel panel reduces the possibility of accident to the operator. The electric lockout device prevents the possibility of starting the motor unless all the secondary resistance is in.

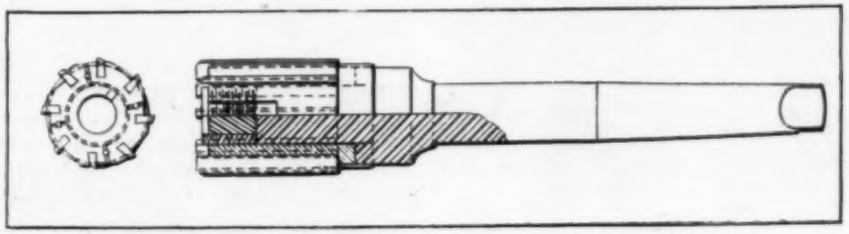
"Castite" Tungsten-Carbide Reamers and Milling Cutters

Strauss Metal (tungsten-carbide) tips are brazed to blades of Seminole tool steel and set in special alloy bases in the reamers and milling cutters announced by Arthur A. Crafts & Company, 125 Summer St., Boston, Mass. The special alloy employed for "Castite" settings absorbs heat drawn from the cutting edges. Tool bodies are also of special alloy. The combination of Seminole steel blades, tipped with tungsten-carbide, with less expensive body material effects savings in cost of the tools.

Differential spacing of the blades in the solid reamer prevents chattering. Extension of blades beyond the body permits facing the bottom of a hole and reaming it to size at the same time. When the expansible reamer is worn under size, one or two turns of the expansion plug in the expansion arbor will bring the reamer back to the size necessary for regrinding. Expansion arbors of standard size may be used with the solid reamers.



Craft Milling Cutter and Expansion Reamer on arbor, both having Seminole steel blades tipped with tungsten-carbide



Method of mounting the blades of "Castite" tools in a special alloy

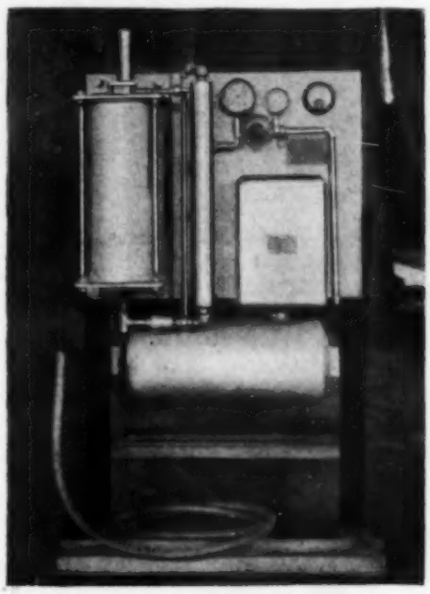
General Electric Dissociation Equipment for Anhydrous Ammonia

Dissociation of anhydrous ammonia into its component parts of 25 per cent nitrogen and 75 per cent hydrogen, to such a degree as to be suitable for use with atomic hydrogen welding equipment, is possible with the dissociation equipment announced by the General Electric Company, Schenectady, N. Y. By this means the hydrogen can be obtained very economically.

The dissociator is capable of supplying enough dissociated gas per hour at atmospheric pressure and temperature to operate a ¼-in. electrode holder for current values up to 70 amp. Gas pressure at delivery does not exceed 10 lb. per sq.in. The electrical rating is 3.5 kw. at 220 volts, 60 cycles, a.c.

The ammonia gas is drawn directly from a standard tank of anhydrous ammonia. This tank is so arranged as to discharge gas and not liquid ammonia into the piping. If kept at room temperatures, the ammonia tank will supply gas at pressures from 100 to 150 lb. per sq.in. at all times.

The dissociator consists of an electrically and thermally insulated alloy tube filled with an ammonia cracking catalyst and connected to a low-voltage, high-current transformer. Suitable inlet and outlet tubes and openings for temperature indicating and controlling devices are provided. All parts subjected to high temperatures are made



Sufficient anhydrous ammonia can be dissociated by the General Electric Dissociator to operate a ¼-in. electrode holder for current values up to 70 amp.

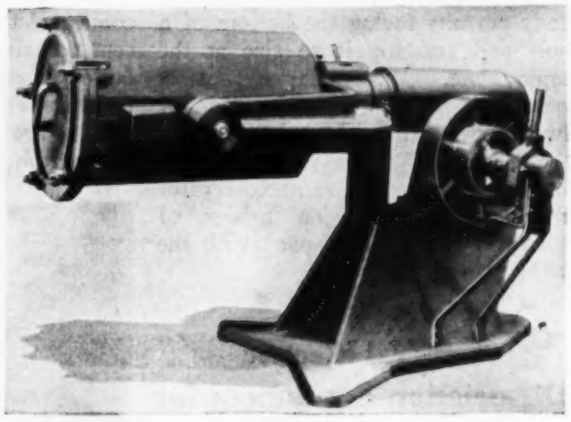
of heat-resisting alloys and are welded at all heated joints. Threaded fittings are provided for replacing the catalyst and the thermocouple. Such screwed joints are placed in unheated parts of the dissociator and will not leak at specified pressures in the dissociator. The equipment is also provided with suitable temperature control and indicating devices, regulator, safety devices, and heat interchanger.

In operation a small snap switch is pressed, and after about 10 minutes the temperature indicator will show a reading within the operating zone. The ammonia tank is then opened and the operator is ready to weld. As soon as the arc is struck the gas will flow and when broken the gas will stop.

Crown Spiral-Gear-Drive Burnishing Machine

A spiral gear drive has been applied to the burnishing machine built by the Crown Rheostat & Supply Company, 1910 Maypole Ave., Chi-

cago, Ill. The machine was originally described on p. 1043, Vol. 72, of *American Machinist*. It is capable of burnishing about one bushel of parts at a time in the No. 1 model and three bushels in the No. 2 model. The driven gear is made of steel, and the driving gear of special phosphor bronze to bring about efficiency and decrease wear. The driving efficiency is claimed to be 97½ per cent, bearing losses not being deducted. Noiseless operation results. Both machines are equipped complete with clutch pulleys.

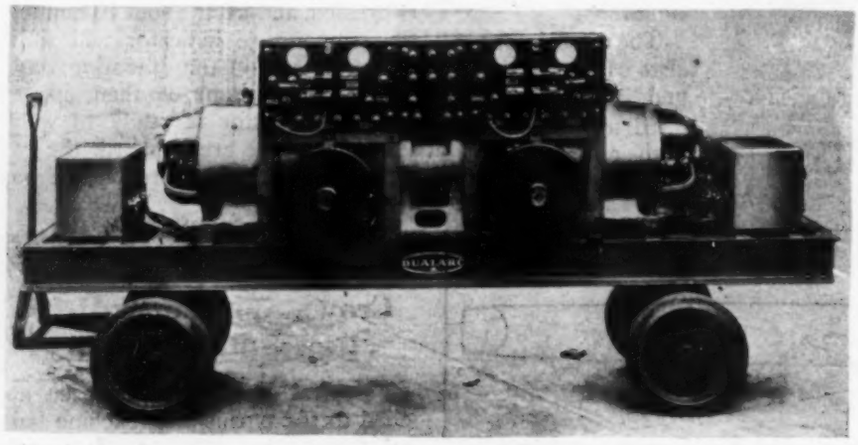


Crown Spiral-Gear-Drive Burnishing Machine available in two models with capacities of one and three bushels, respectively

"Dualarc" Improved Arc Welding Equipment

Improved "Dualarc" arc welding equipment in both motor-generator sets and gasoline-engine driven models are now available from the Electric Arc Cutting & Welding Company, 152 Jelliff Ave., Newark, N. J. These machines employ the two-arc arrangement, which does away with the usual trouble of unbalancing. The arrangement is effected by connecting two generators in multiple by cross-connection of the series field, thus giving definite assurance that the two generators remain parallel. Current from the armature of the first generator goes through the series field of the second, and vice versa, thus preventing either of the two generators from taking more of the load than is its share.

Each generator can be controlled separately to meet the arc requirements of two operators working simultaneously, or the two generators can be put in series to obtain high voltage for cutting or for carbon arc work. Such an arrangement gives a wide range of power and also offers economy of operation. A full 600-amp. current is produced as against 450 amp., which is the amount obtainable with the usual compound-resistance control sets.



"Dualarc" Improved Arc Welding Equipment of the motor-generator type

Mikrotast Fine Wire Gage

For gaging fine wire up to $\frac{7}{32}$ in., the Krupp Mikrotast fine wire gage is available from the Coats Machine Tool Company, Inc., 110-112 W. 40th St., New York, N. Y., the importer. The gage is set by loosening the lower lock nut and then raising the lower contact anvil by means of the upper knurled disk, until the gap between the two anvils corresponds approximately to the diameter of the master wire. This wire is then inserted and the upper knurled disk turned until the indicating pointer stands in the center of the scale. The locknut secures the exact setting and red tolerance markers are adjusted right and left of this setting in accordance with the permissible tolerances. For gaging thin sheets, the back-stop shown may be removed altogether.

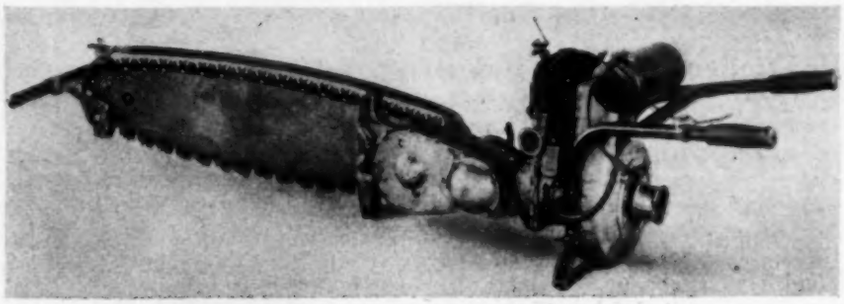
Mikrotast Fine Wire gage for material up to 7/32 in. thick

The fan-shape Mikrotast indicator operates on the knife-edge principle, and is furnished in 40 divisions of 0.00005 in. or 50 divisions of either 0.0001 in., 0.0002 in., 0.0005 in., and 0.001 in.

Wolf Portable Timber Sawing Machine

For sawing heavy timbers in the large plants, such as the shipbuilding yards, the work may be facilitated by means of the Wolf portable timber sawing machine developed by the Reed-Prentice Corporation, Worcester, Mass. The saw illustrated is a gasoline-driven type and may be had with 16- and 24-in. capacities. The saw is made with a swivel movement so that cutting can be performed either vertically or horizontally, allowing the engine to remain in the vertical position.

Cutting is performed by a chain



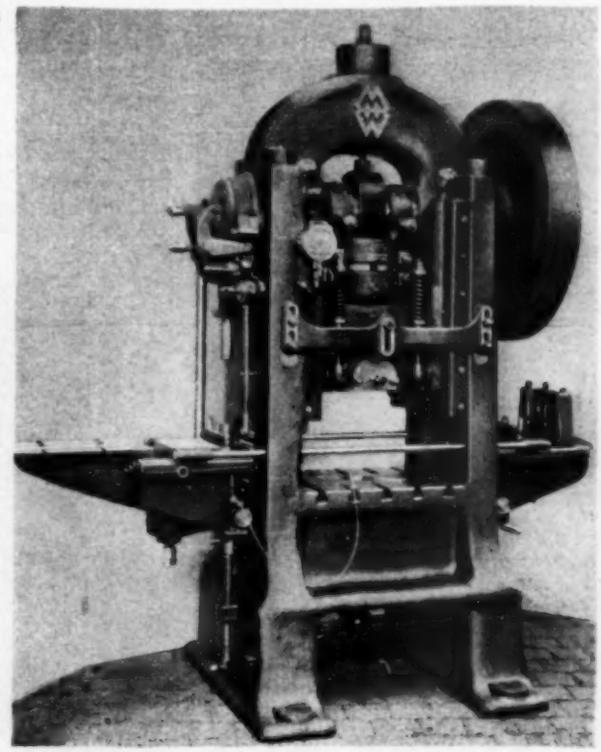
Wolf Portable Timber Sawing Machine which is available in 16- and 24-in. capacities

traveling about the center frame, the links of this chain containing teeth. In order to start and stop the chain independent of the motor, a multiple-disk clutch is furnished. Whenever the saw has a tendency to stall, the clutch will slip rather than stall the motor. The weight of the 16-in. capacity saw is 82 lb., and that of the 24-in. saw is 92 lb. A 20x20-in. timber can be cut through in approximately one minute.

Schatz Automatic High-Speed Press with Grip Feed

Five sizes are included in the line of automatic high-speed presses with grip feed announced by The Schatz Manufacturing Company, Poughkeepsie, N. Y. These sizes will exert pressures up to 35, 55, 90, 140 and 225 tons, respectively, with speeds up to 300 strokes per minute for the smallest machine and 75 strokes per minute for the largest. It is claimed that the grip feed is accurate. There are two sliding carriages connected by bars, which are easily removable when changing tools, and on each side is a grip lifted by cams. In each housing is a fixing grip for holding the material in place while being punched. These fixing grips release automatically when the strip is to be advanced. At the extreme right is a scrap shear adjustable to cut the strip at its weakest point. Tools with or without pilot pins can be employed.

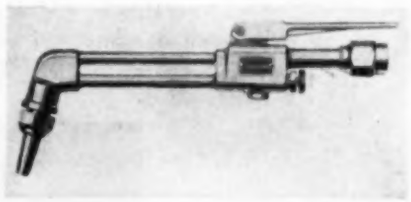
The frame is reinforced with four hot-shrunk steel tie-rods. This feature and the long guide rods, the spring balanced ram and the multiple-disk friction clutch are employed to afford long tool life, particularly where follow dies are used. The maximum amount of space in the bed is provided for stacking devices, which are motor driven on the larger models. High die-space is provided and the ram is adjustable. Safety devices employed permit the operator to confine his attention to feeding strips or coils.



Schatz Automatic High-speed Press with Grip-Feed available in 35- to 225-ton models

Attachments for "Oxweld" W-17 Welding Blowpipe

Two accessories for the W-17 welding blowpipe have been introduced by the Oxweld Acetylene Company, 30 E. 42nd St., New York, N. Y., to make this blowpipe capable of doing almost any type of work required of an oxy-acetylene blowpipe. The first, a cutting attachment, will cover a reasonably wide range of cutting work. It will be noted that a long handle is used for operating the cutting oxygen valve. When this handle is not in use, it can be pulled forward parallel to the tubes so that the whole attachment may be carried around in the operator's pocket. The same style stem



Oxweld CW-17 Cutting Attachment in the operating position

lock nut is employed as on the welding head. The injector for the heating flames is contained in the attachment in like manner to those of the welding heads. At the rear of the attachment near the bottom is an adjusting screw, so that the oxygen for the heating flames may be regulated by the operator's thumb and forefinger while the blowpipe is in operation. No wrench is required to join the attachment to the handle, the operation being performed in the same manner as a welding head. Two cutting nozzles are supplied with the attachment.

The other accessory for the W-17 welding blowpipe is the W-17 to W-15 adaptor, which makes it possible to use any of the welding heads available for the W-15 sheet metal

welding blowpipe with the W-17 welding blowpipe handle. By means of this attachment, the W-17 may be used on work ranging from the lightest type of welding to heavy general welding work. The adaptor contains passages for the oxygen and

Oxweld W-17 Blowpipe Handle with adaptor and W-15 Welding Head

acetylene, these passages fitting tightly against the passages in the blowpipe handle.

Pels Improved Type FV Heavy Billet Shears

Cleaner cutting off of bar stock is effected by new style knives on the Type FV heavy billet shears distributed by Henry Pels & Company, Inc., 90 West St., New York, N. Y. On steels of high hardness and strength, such as the alloy steels, these knives will give clean cuts.

All the improvements embodied in the type FV shears are carried in the type FV-75, shown in Fig. 1. Among these features is a band brake on the eccentric shaft and controlled by the clutch mechanism, which automatically stops the shaft in its highest position. A special backlash pin is built in the clutch so that backlash will not interfere with the smooth operation of the clutch when very hard steel is being cut. These two features assure trouble-free clutch operation. The new style knives, as mentioned above, can be furnished for cutting square as well as round stock. Automatic forced-feed lubrication is also supplied on the machine illustrated as standard equipment.

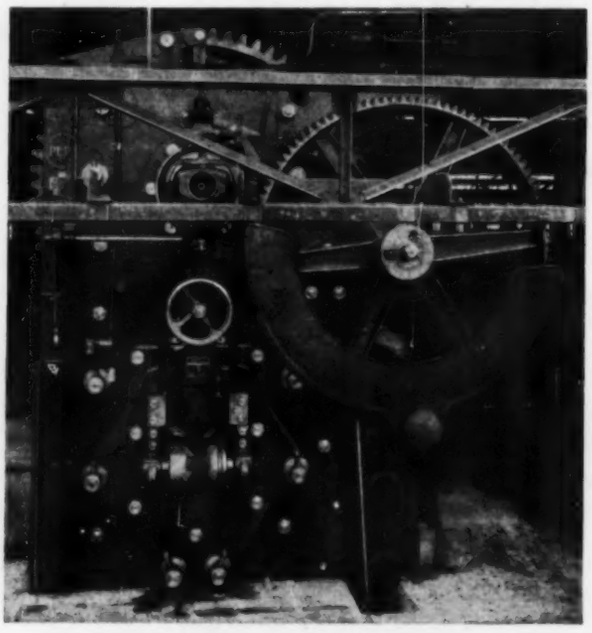


Fig. 1—Pels Type FV-75 Billet Shear, which has capacity for 7⅛-in. rounds, cold. Improved features include a band brake on the eccentric shaft and a special backlash pin on the clutch to permit cutting alloy steels without clutch difficulties

"Modern" Model H-3 Tungsten-Carbide Lapping Machine

Another model has been added to the line of tungsten-carbide lapping machines built by the Modern Diamond Tool Company, 1050 Mt. Elliott St., Detroit, Mich. The weight of the machine is about 350 lb., and it is driven by a ½-hp. electric motor in the base, the lapping wheel and spindle running at one-half the motor speed. The spindle is mounted upon extra large adjustable thrust ball bearings. It is furnished with either a plain or copper-studded lapping wheel for diamond lapping of tungsten carbide. This wheel cuts very fast and produces a sharp keen edge upon the tool in a few seconds.

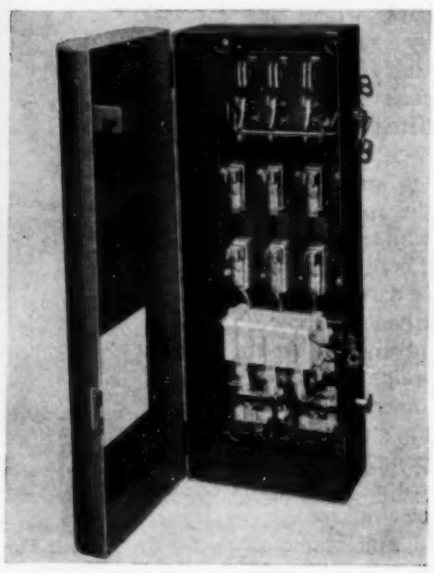
The machine has an adjustable horizontal slide, a vertical slide, and a platen or work holder, permitting the tool to be moved across the periphery or face of the wheel as desired. This platen also has angular adjustment. An angular gage is made to slide across the top of the platen. It is necessary to keep the lapping wheel slightly moist with a mixture of olive oil and diamond powder. Production of a tool is raised by lapping from

"Modern" Model H-3 Tungsten-Carbide Lapping Machine, which permits lapping of a tool cutting edge at any angle

20 per cent to 5 times as much as a plain rough ground tool.

Square D Classes 8532-6 & 7K A.C. Contactors

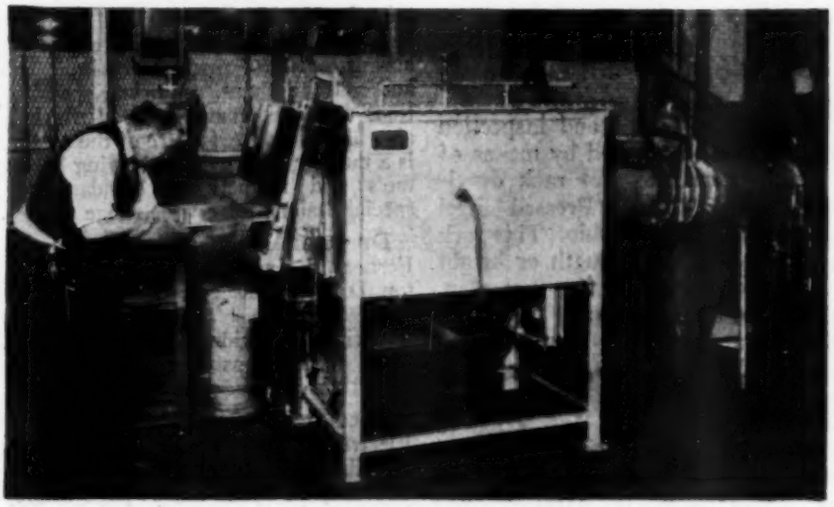
Three a.c. contactors for across-the-line service have been placed on the market by the Industrial Controller Division of the Square D Company, Milwaukee, Wis. These starters are known as Classes 8532K, 8536K, and 8537K. They consist of an automatic starter providing low voltage and overload protection, and



a quick-make and quick-break knife switch mounted in the same cabinet. These switches are provided with arc suppressors, which increase their breaking capacity at the higher voltages. The switches will break the stalled rotor current of motors within the ratings of the starters. An interlock is provided which prevents opening the door of the cabinet unless the switch is in the "off" position.

These starters can be supplied either not fusible or fusible for branch line protection. They may be controlled by push buttons or automatic pilot switches, such as pressure and float switches, and thermostats. Combining these two units in one cabinet saves considerable space over that required by separate units, and reduces the time required for installation and wiring.

General Electric High Temperature Furnace With Reducing Atmosphere



Copper brazing tungsten-carbide tools in the General Electric Hydrogen Electric Furnace

A production type furnace suitable for temperatures up to 2,600 deg. F., and especially adaptable to processes requiring a reducing atmosphere, has been placed on the market by the General Electric Company, Schenectady, N.Y. Among such processes are copper brazing, the manufacture of Carboloy, and the brazing of Carboloy tips to steel.

The heating element of the furnace consists of molybdenum wire and operates in a hydrogen atmosphere to prevent oxidation of the wire and the charge. The manually operated door prevents oxygen from getting into the furnace and oxidizing heating units or the work. It is of cast iron and slides on an inclined casting, and thus the weight closes the door firmly to effect a seal against the escape of hydrogen and to afford exclusion of air from the furnace.

Work is pushed from the furnace into the cooling chamber, where it is allowed to cool in a hydrogen atmosphere. Two cooling chambers are provided, the second one being equipped with a water jacket that allows the work to cool below the oxidizing temperature before it is removed. The production of the cooling chamber is equal to that of the furnace. A refractory door prevents excessive heat loss.

The furnace has a rating of 10 kw. 220 volts, single-phase. Heating chamber dimensions are 2½ ft. long by 4 in. high by 6 in. wide. Gas consumption is about 30 cu.ft. per hour and the radiation losses are about 6 kw. per hour at 2,200 deg. F. Automatic temperature control is provided and heating elements are replaced easily in case of burn outs.

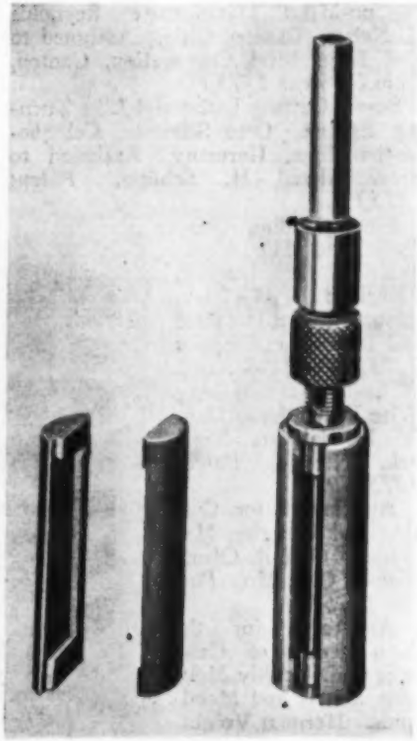
The over-all dimensions are 5 ft. 4 in. high by 6 ft. long by 2 ft. 10 inches wide.

Brickner-Kropf Series 200 Toolroom Lap

A toolroom lap made in sizes from $\frac{5}{8}$ to 1 in. in diameter has been placed on the market by the Brickner-Kropf Machine Company, Muskegon, Mich. This lap makes use of two inserts die cast from a medium hard alloy that will take the charge of lapping compound readily and will give long service. The use of these inserts in holes of larger diameter than $\frac{1}{16}$ over size is not recommended. Six inserts cover the range.

Lapping may be carried out at speeds up to 175 ft. per min. Positive adjustment of the wall pressure while in motion can be made, the adjustment being $\frac{1}{8}$ in. Lapping to the bottom of a blind hole can be effected. After the lap is fully charged, additional abrasive should be used sparingly and should be mixed with olive oil and applied with brush. Where extremely high finishes are required, the lap should be operated dry at slow speed, after having been fully charged.

The Series 200 lap is supplied with a floating driver and a straight shank $\frac{15}{16}$ in. in diameter as standard, although special shanks can be supplied on order.



PATENTS

SEPTEMBER 16, 1930

Tools and Attachments

Hack Saw with Motor-Reciprocated Blade. Mark A. Plut, Leadville, Colo. *Patent 1,775,692.*

Automatic Air Clamp and Release for Tubular Bender. Harry E. Harvey and Earl K. Holmes, Cleveland, O. Assigned to Steel and Tubes, Inc., Cleveland, Ohio. *Patent 1,775,761.*

Chaplet. Ernst Sonnet, Berlin-Schlachtensee, Germany. *Patent 1,775,874.*

Valve-Seat Grinder. George W. Fleming, Worcester, Mass., assignor to Fleming Machine Co., Worcester, Mass. *Patent 1,775,898.*

Measuring Device in Connection with Boring Machines. Fernand Turrettini, Geneva, Switzerland. *Patent 1,775,952.*

Chuck Device and Drill Chuck. George W. Emrick, N. Y., assignor to Ettco Tool Co. *Patents 1,775,992 and 1,775,994.*

Grinding Machinery. John E. Caster and Fred S. Haas, Cincinnati, Ohio, assignors to Cincinnati Grinders Incorporated. *Patent 1,776,241.*

Cutter-Carrying Head for Multiple Lathes. Lester E. Cobb, Norway, Me. *Patent 1,776,180.*

Metal-Working Machinery

Pipe-Cutting Machine. Worthy C. Bucknam, Freeport, N. Y. Assigned to The Prairie Pipe Line Co. *Patent 1,775,667.*

Spun-Metal Manufacture. Reynolds G. Nelson, Canton, Ohio. Assigned to The Spun Steel Corporation, Canton, Ohio. *Patent 1,775,732.*

Screw-Cutting Lathe and Like Turning Engine. Otto Schaerer, Cologne-on-the-Rhine, Germany. Assigned to Firm Alfred H. Schütte. *Patent 1,775,737.*

Pipe-Bending Machine and Method. Harry E. Harvey, Cleveland Heights, Ohio. Assigned to Steel and Tubes, Inc. *Patents 1,775,760 and 1,775,762.*

Machine for Making Wire Formations. Daniel Kondakjian, Newark, N. J. *Patent 1,775,770.*

Attachment for Cutting and Flanging Machines. Olof R. Olson, Kansas City, Mo. *Patent 1,775,864.*

Apparatus for the Manufacture of Castings of Difficultly Meltable Metals and Metalloids. Herman Voightländer and Otto Kaufels, Essen, Germany, assignors to Gewerkschaft, Wallram Abteilung Metallwerke. *Patent 1,776,053.*

Polishing Machine. Arnold L. Brown, Wooster, Ohio. Assigned to The Buckeye Aluminum Co. *Patent 1,776,143.*

Portable Motor-Driven Hack Saw. Thomas E. Sinclair, St. Paul, Minn. *Patent 1,776,173.*

Furnaces

Apparatus for Heat-Treating. Richard M. Heames, Grosse Point, and Birger W. Lindquist and Harold Stark, Detroit, Mich. *Patent 1,776,117.*

Melting Pot. Albert N. Otis, Schenectady, N. Y. Assigned to General Electric Co. *Patent 1,776,128.*

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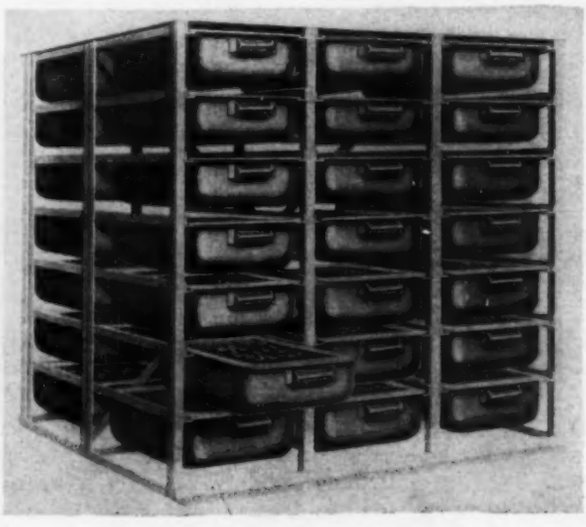
Powell Visible Steel Tote Pan Rack

Convenient storage and inspection of parts can be effected by means of a visible steel tote pan rack developed by the Powell Pressed Steel Company, Hubbard, Ohio. This rack may be built in any length or height required and employs the unit plan. Heavy steel members are used, and all joints are arc-welded and strongly reinforced. The top has a heavy steel plate to give rigidity and strength.

These tote pan racks can be moved easily from place to place, and where frequent removal is essential, they can be mounted upon a standard "Powell" pressed steel lift truck platform. One of the principal features of this rack is the visibility of materials stored, being of special value in plants where unskilled labor is employed, and where indexing of pans or storage bins would be impractical.



TRADE PUBLICATIONS

BALL BEARINGS. The Strom Bearing Co., 4535 Palmer St., Chicago, Ill., has issued Catalog No. 12, which is a 192-page data book showing types and sizes of single-row radial, double-row radial, 200 per cent and 300 per cent angular contact and M.R.C. thrust bearings. Dimensions, load carrying capacities at various r.p.m., and other data for selecting and mounting ball bearings are given.

BORING TOOLS. The Davis Boring Tool Co., division of Larkin Packer Co., St. Louis, Mo., has published a loose-leaf, indexed catalog of its expansion boring tools and reamers for industrial and railroad shops. Complete specifications are listed for each item, which is also illustrated. A feature of the catalog is a number of drawings showing boring tools and reamers of standard and special designs for a wide range of uses.

DIVIDING MACHINES. The R. Y. Ferner Co., Investment Bldg., Washington, D. C., has issued catalog No. 508 on Société Genevoise high precision linear and circular dividing machines. Complete descriptions are given of the operation of these units.

ELECTRICAL TOOLS. The Standard Electrical Tool Co., 1938-46 West Eighth St., Cincinnati, Ohio, is distributing an 8½x11-in., 64-page catalog, No. 36, featuring and describing its complete line of electric drills, grinders, buffers and polishers, together with a price list effective as of October 1.

LATHE, BENCH. Hardinge Brothers, Inc., Berteau & Ravenswood Aves., Chicago, Ill., are distributing a folder illustrating its motor-driven bench lathe units, motor-driven bench lathes, motor-driven hand screw machines, and motor-driven bench units and transmissions.

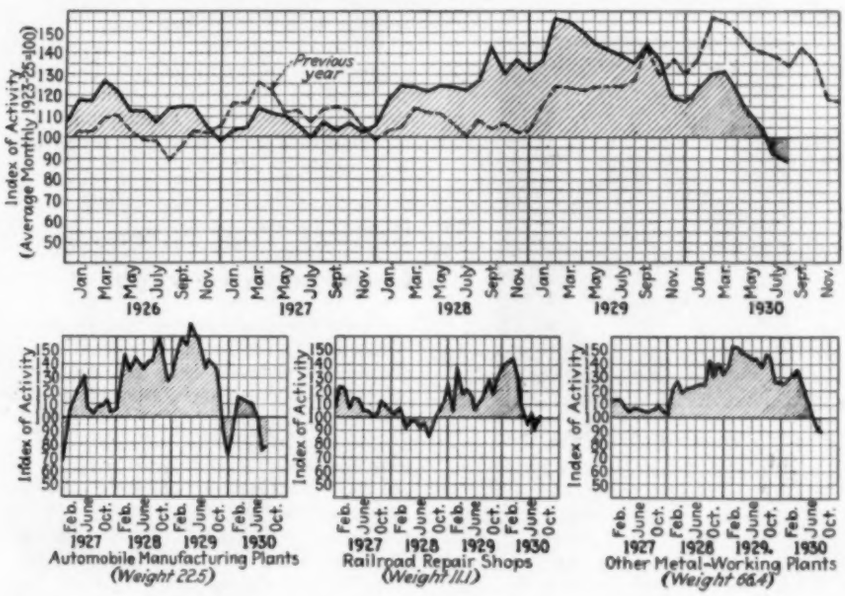
SPEED REDUCERS. Bulletin 230 published by the Falk Corporation, Milwaukee, Wis., describes its complete standardized line of parallel-shaft, herringbone speed reducers carried in stock. Descriptions and rating tables, illustrations of large special drives, general installation views, and a price list are included.

TAPS AND DIEHEADS. Catalog No. 30 is being distributed by the Murchey Machine & Tool Co., 951 Porter St., Detroit, Mich., showing its automatic collapsible taps, automatic opening dieheads, and special threading tools. Specifications and descriptions of these tools are presented, being followed by material on the Murchey chaser and die grinder.

NEWS OF THE WEEK

August Metal-Working Operations Show Slowing of Decline

AUGUST operations in the metal-working plants of the country were on a slightly lower plane than those of July. Reports received on the consumption of electrical energy for power purposes indicate that the downward trend which started in March and continued until July has been definitely arrested after reaching the lowest point since October, 1924. The rate of operations in metal-working plants during August was 88.0 per cent, as compared with 90.4 for July.



The automobile industry, including the manufacture of parts and accessories, reported an index of activity of 78.1, as compared with 75.3 for July. The July figure was the lowest recorded since January, 1925. July activity was 27.5 per cent less than that of June and 48.4 per cent less than that of July of last year. In the ferrous and non-ferrous metal-working plants outside of automobile and railroad repair shops, the reported figure was 89.4, as compared with 95.1 in July. This rate of operation is the lowest recorded since June, 1925.

Activity in the railroad repair shops showed a decided increase during August, going from 92.3 in July to 100.7. These plants were operating in July at the lowest point since the barometer was established at the opening at 1923. Adjusted for seasonal variations, the preliminary figure for August for the entire metal-working group shows 93.2 per cent, as compared with 95.1 per cent, adjusted for seasonal variations, in the month of July.

Bricker Becomes Ordnance Assistant—Commerce Division to Be Split

PAUL WOOTON
Washington Correspondent

WASHINGTON, D. C., Sept. 25—Col. Edwin D. Bricker, chief of the technical staff of the Army Ordnance Department, has been nominated as Assistant to the Chief of Ordnance and Chief of Field Service, with the rank of Brigadier General from Sept. 1. Brig. Gen. Bricker succeeds Brig. Gen. Samuel Hof, who followed Major Gen. C. C. Williams as Chief of Ordnance last May. Brig. Gen. Bricker was graduated from West Point in 1898 and has served in the Ordnance Department since 1901. He was awarded the distinguished service medal and two silver star citations during the war.

Lt. Col. C. M. Wesson, assistant military attaché at London, will succeed Brig. Gen. Bricker as chief of ordnance research and development. Col. Wesson was graduated from the Military Academy in 1900 and has served alternatively in the Cavalry and in the Ordnance Department. He received the D. S. M. for war service and was graduated from the Army War College in 1925.

Plans are being completed at the Commerce Department for the purpose of reorganizing the Domestic Commerce Division. What is now the Domestic Commerce Division will be broken down and reorganized into three new divisions. The work formerly done by the division will be executed by closer co-ordination with the activities of the existing commodity and technical divisions, which function in the interest of foreign commerce. William L. Cooper, director of the bureau, will be head of all three divisions.

The three new technical divisions are Merchandising Research, Domestic Regional, and Marketing Service. H. C. Dunn, present head of the Domestic Commerce Division, will be the head of the Merchandising Research Division. E. F. Gerish will be placed in charge of the Domestic Regional Division and Edwin B. George will be the head of the Marketing Service Division. The work of the Merchandising Research Division will include all studies on the cost of distribution, credit research, industrial marketing, and special surveys made in co-operation with trades and industries.

According to the new program, the Domestic Regional Division will supervise all regional commercial surveys. This division also will include in its activities studies on domestic regional distribution and movement of commodities, as well as the Market Data Handbook work. The Marketing Service division will include the present work on special inquiries, the preparation of the publication "Domestic Commerce" and interpretive studies, and such recurring publications as "Market Research Agencies" and "Commercial and Industrial Organizations."

A mountain of material has been gathered by the Bureau of the Census. The question now is: how can all the material be made readily available to those to whom it is valuable. The Department of Commerce is now working out such a plan. It has been learned from experience that more has to be done than place the figures on the business man's doorstep. In some cases that

is all that it is necessary to do, but a surprising percentage makes no use of such statistical information. The plan has not been perfected but will require the close co-operation of the trade associations. This is the first time that the Census has been taken along lines indicated by manufacturers themselves.

A transition from one new era to another new era is seen in the present business depression. The last cycle of prosperity had its principal support in the construction and automobile industries. The new era, in the opinion of some economists, will draw its impetus from the further development of the electric power and gas industries. Trends in the development of those activities will furnish the backbone, they believe, for just as enduring a cycle of prosperity as that ended last October.

This forecast is based on the assumption that the cost of electricity and gas will be reduced materially from present levels, which will stimulate railroad electrification and will result in much greater consumption by industries, by domestic consumers, and in agricultural regions.

Safety Council Meets in Pittsburgh

More than 1,700 different metals industries companies who are co-operating through the National Safety Council will be represented at the 19th Annual Safety Congress and Exposition to be held in Pittsburgh during the week of Sept. 29. In these industries three groups are represented—metals, automotive, and power press. The Metals Section, in the four half-day sessions of its congress, will consider a number of safety questions including an analysis of accident causes in the metals industries for 1929. Other subjects to be considered are safety problems of the foremen, safety in the erection of steel, foundry engineering as related to safety, and a round-table discussion of foundry hazards. Dr. R. H. Lansburgh, former secretary of the Pennsylvania Department of Labor and Industry, will talk on "The Machine Age and its Relation to Accident Prevention."

The Automotive Section program will specialize in a discussion of problems relating to foot injuries, portable hand tools, industrial care of the eyes, and selling safety to the man on the job. One of the features of the program will be an address by J. H. Maguire, general manager of the Haynes Stellite Co., on "Safety and Its Relations to Production."

Before the Power Press Section, H. C. Howsam, superintendent of the Hubbard Spool Co., will discuss the problem of "Production with Safety in a Small Power Press Plant." W. D. James, president of the James Manufacturing Co., will tell "Why Safety is a Paying Proposition." Another feature of the program will be an address by R. G. Knutson, member of the Industrial Commission of Wisconsin, on "What we Think of Punch Press Guarding." A motion picture showing mechanical processes of interest to the industries will also be exhibited.

One of the features of the Congress will be a complete Safety Exhibit, utilizing two complete floors of the William Penn Hotel.

Tariff Commission Announced by President

Henry P. Fletcher, former ambassador to Italy, took office on Sept. 16 as chairman of the new Tariff Commission chosen by President Hoover. Other

Keystone

HENRY P. FLETCHER

members so far announced include Edgar B. Brossard and Alfred P. Dennis, of the former commission, and John L. Coulter and Thomas W. Page. One member remains to be appointed.

Gray Iron Institute Issues Meeting Program

The Third Annual Convention of the Gray Iron Institute, to be held in Cleveland on Wednesday, Oct. 8, will consider fundamental issues confronting every gray iron foundryman. Technical research, progressive marketing, beneficial co-operation, and profitable cost control are some of the subjects to be brought before the convention. The present schedule of speakers includes Dr. Zay Jeffries, John S. King, Philip P. Gott, A. C. Denison, and D. M. Avey.

AT THE close of the annual meeting of the International Industrial Relations Association, The Hague, Holland, which has just taken place at Geneva, the decision was announced to take as the subject for the second triennial congress at Amsterdam, Holland, in August, 1931, the subject "The Dependence of Satisfactory Human Relations in Industry upon the Scientific Adjustment of Economic Resources, Production, and Consumption."

Pratt & Whitney to Hold 70th Annual Reunion

Wednesday, Oct. 1, will be set aside by the Pratt & Whitney Co., Hartford, Conn., to commemorate the seventieth anniversary of its existence. The celebration will take the form of a reunion of as many old employees of the company as can be gathered together. Clayton R. Burt, president, is planning to hold open house at the plant in Hartford, Conn., and will welcome all Pratt & Whitney men who can be present. The entire plant will be open for inspection in full operation at 1 o'clock on that day, and arrangements are being made to take visitors through the various departments and buildings. In the evening the company will honor, by a banquet at the Hartford Club, all Pratt & Whitney men who have served the company 20 years or more. Outstanding men of the machine-tool industry have been invited to attend, and it is expected that more than 400 people will be present.

Railway Tool Foremen Convene in Chicago

Modern heavy-duty machinery should be tooled up for as many operations as possible in order to keep the equipment in motion the greatest amount of time and to realize fully on the investment—a job that taxes the ingenuity of the tool foreman. This was brought out by O. A. Garver, chief mechanical officer of the Missouri-Pacific R.R., in his opening address at the 18th annual convention of the American Railway Tool Foremen's Association, held Sept. 10-12 in Chicago. Railroads throughout the country are discarding obsolete machines and are replacing them with more modern machine tools capable of much greater production, he contended.

Others to address the convention were: A. A. Ferguson, tool supervisor, Missouri-Pacific R.R., who delivered the President's address; H. Guilbert, director of safety, the Pullman Co., who spoke on "Safety First"; Alexander H. d'Arcambal, of the Pratt & Whitney Co., whose topic was "Heat-Treatment of Steels"; and H. N. Anderson of the Acme Machinery Co., who spoke on "Forging Machine Dies." Several committees submitted formal reports; one on tools and methods for mass production, another on testing devices for pneumatic tools and jacks. The standardization committee also reported.

For the ensuing year the following officers were elected: President, H. L. Taylor, Baltimore & Ohio R.R.; vice-president, J. T. Jones, New York Central; D. L. Grady, Atlantic Coast Line; M. B. Roderick, Erie; secretary-treasurer, G. G. Macina, Chicago, Milwaukee, St. Paul & Pacific. E. J. Carroll, Chesapeake & Ohio, is chairman of the executive committee on which W. H. Smith, E. S. Behen, R. B. Loveland, and L. C. Bowes will serve.

Screw-Machine Data Taken from 1930 Census

The Bureau of the Census has announced that, according to data collected to date in the Census of Manufactures, the total shipments or deliveries of screw-machine products and wood screws in 1929 by manufacturers in the United States engaged primarily in the production of these commodities were valued at $83,266,687. This figure represents an increase of 66.5 per cent as compared with $50,009,983 reported for 1927, the last preceding census year. The 1929 total represents screw-machine products valued at $73,540,131 and wood screws valued at $9,726,556.

In addition, screw-machine products and wood screws are manufactured to some extent as secondary products by establishments engaged primarily in other lines of manufacture. The value of screw-machine products thus made outside the industry proper in 1927 was $8,070,776, and of wood screws, $1,840,204. These figures represent amounts equal to 18.8 per cent and 26.2 per cent, respectively, of the total values of these class of commodities made within the industry. Corresponding values for 1929 have not yet been ascertained.

According to the included table given with the census statistics, there are 254 establishments manufacturing these products, an increase of 16.5 per cent over the last census. Some 18,749 workers are now employed, as compared with 13,690 in 1927, an increase of 37 per cent. This figure does not include salaried employees and is an average for the several months of the year.

Canadian Steel Output Rises 20 per Cent in 1929

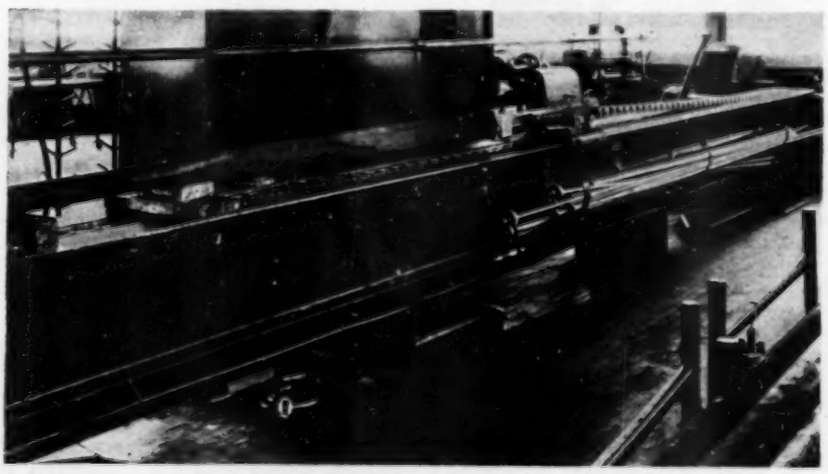
Production in Canada of iron and steel and their manufactures increased in value last year by about $123,000,000 over 1928. The total, at $732,390,000, was 20 per cent above the corresponding figure for the previous year and exceeded in value the output for any previous year excepting 1918. The plants in the Canadian iron and steel industry are classified in 13 industrial groups, 12 of which showed higher output values in 1929 than in the preceding year. The outstanding gain was in the railway rolling stock industry with production valued at $126,382,788 as against $73,422,057 in 1928. The automobile industry advanced by $15,000,000 to $177,315,593; automobile parts by $16,000,000 to $33,465,000; primary iron and steel by $7,000,000 to $68,728,000; castings and forgings by $12,000,000 to $93,555,000; boilers and engines by $3,000,000 to $9,774,000; agricultural implements by $6,000,000 to $47,306,000; machinery by $6,000,000 to $57,283,000 and wire goods by $1,000,000 to $20,057,655. The miscellaneous iron and steel group declined slightly to $16,823,000.

New Standards And Specifications

The Federal Specifications Board has recently resubmitted the proposed Federal Specifications for "Pipe Fittings, 125 lb., Brass or Bronze, Threaded." The board welcomes any comments or criticisms as to changes which may be thought desirable in the specifications. Such comments or criticisms must be received not later than the end of October.

Simplified Practice Recommendation R26-30 on steel reinforcing bars is effective as of Sept. 11. Sufficient signed acceptances from manufacturers, distributors, and users to insure general adoption of the program by the industry as a whole were received.

The proposed standard for 25-lb. cast iron flanges and flanged fittings has been transmitted to the American Standards Association for approval and designation as an "American Tentative Standard" by the three joint sponsors for standardization.



Square, rectangular, and streamlined aircraft tubing is drawn from round stock on this drawbench, designed and built by the Boeing Airplane Co. It is powered with a 15-hp. motor, geared to give drawing speeds of 15 and 25 ft. per min.

Metal Wholesale Prices Again Average Lower

Wholesale prices of metals and metal products, referred to in 1926 as 100, showed a decline of 1.6 per cent in August, according to the U. S. Department of Labor, Bureau of Labor Statistics. Figures just released by the Bureau show the general index for metals and metal products at 92.7 for August, as compared with 94.3 for July and 104.3 for August, 1929. The index for iron and steel was 90.1 for August, 90.7 for July, and 97.6 for August, 1929, while that for non-ferrous metals was 72.7 for August, 73.5 for July, and 105.1 for August, 1929. Agricultural implement figures were 94.9 for August, 94.9 for July, and 98.3 for August, 1929. Those for automobiles was 102.5 for August, 105.5 for July, and 110.7 for August, 1929. Those for other metal products for both July and August show 98.4, as compared with 98.5 in August, 1929. The purchasing power of the 1926 dollar in August was $1.079, in so far as metals and products are meant.

Arrest of the recent downward trend of wholesale prices generally is shown in the general figures. The Bureau's general index, based on 550 commodities or price series, stands at 84.0 for August, as compared with the same figure for July. The purchasing power of the 1926 dollar remained at $1.19.

Industrial Research Tour Planned Next Month

The National Research Council is sponsoring a one week tour of the laboratories of various major companies in this country. Some 150 to 200 industrialists, executives, bankers, and others interested in the meaning of the work of these centers of scientific development will be included in the party. The schedule includes the laboratories of the Bell Telephone Co., General Electric Co., General Motors Co., U. S. Air Service Engineering Division, American Rolling Mill Co., Aluminum Co. of America, Mellon Institute of Industrial Research, U. S. Bureau of Standards, and National Canners' Ass'n.

Two Plants Set Safety Records

Seventy-four employees in the power plant department of the El Paso Electric Co., El Paso, Texas, worked 415 days without a chargeable or lost-time accident. This is a total of 245,860 man-hours, or 3,320 man-hours per man.

Four thousand employees of the United States Aluminum Co. operated the plant at New Kensington, Pa., for one month without a lost-time accident. The record approximates 1,000,000 hours of working time with large and small complicated machinery.

BUSINESS ITEMS

The Union Carbide & Carbon Co., New York City, has completed arrangements for the acquisition of control of the International Oxygen Co., New York. The latter company had assets of $1,761,586 on March 10 of this year.

The Landis Machine Co. of Canada, Ltd., Welland, Ont., has changed its name to the Canadian Landis Machine Co., Ltd. J. N. Stickell is superintendent and C. H. Gilland, special sales representative.

The exhibit of the Westinghouse Electric & Manufacturing Co. at the National Metal Congress in Chicago features arc-welding equipment and industrial heating apparatus. A feature is a welding booth in which the visitor may try his skill at welding with a new type of Westinghouse electrode.

After Oct. 1, the general office and main sales office (exclusive of sales of special drop-forgings to order) of J. H. Williams & Co., Buffalo, N. Y., will be consolidated with the present eastern sales office and warehouse at 75 Spring St., New York City. A service department will be retained at Buffalo.

The formal opening of the new factory of Fairchild Aircraft, Ltd., Longueuil, Que., took place on Sept. 5. The factory represents the most modern thought in airplane plants insofar as arrangement of departments and provision of maximum light are concerned. It has all necessary equipment for both manufacture and repair work. The plant has 38,000 sq.ft. of floor space and is designed to turn out about 150 complete planes a year.

Darwin & Milner, Inc., Cleveland, Ohio, the American Division of Darwins Ltd., Fitzwilliam Works, Sheffield, England, have appointed Albert Goldman, 4421 No. Ninth St., Philadelphia, Pa., as eastern Pennsylvania and East Coast representative.

The Canadian Sumner Iron Works, Ltd., Vancouver, B. C., is building a new machine shop at a cost of about $30,000. The building will be of frame construction with galvanized iron roof, one story high and 241x104 ft.

The Electro-Metals Products Corporation, Baltimore, Md., has established a plant at 612 W. Ostend St.

The Triplex Lawn Mower Co., Platteville, Wis., has sold its entire business including stock, tools, and machinery to the White Machinery Co., Eau Claire, Wis.

The Pressed Steel Car Co., Chicago, is adding a power unit and planning additions to its Hegewisch (Ill.) steel foundry.

The Foreman Motor & Machine Co. Ltd., Toronto, Ont., has changed its address to 49 Leslie St., Toronto.

The Victory Engineering & Sales Co. Inc., Detroit, has moved to 2,950 Woodbridge St., East.

The Storts Welding Co., Meriden, Conn., has acquired properties from Manning Bowman Co. and Edward H. Miller which it will utilize for expansion purposes.

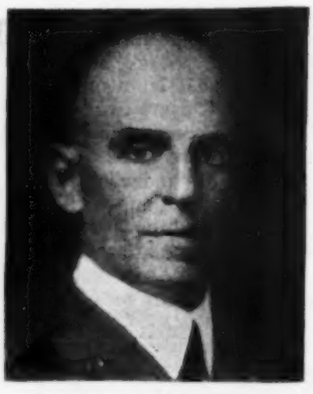
The Bastian-Blessing Co., 240-258 E. Ontario St., Chicago, occupying Booth 96 at the National Metal Congress, has on display the welding and cutting equipment it manufactures, in addition to a line of compressed air regulators.

The Kelley-Koett Manufacturing Co., Inc., Covington, Ky., is exhibiting industrial X-ray pictures at Booth 8-F at the National Metal Exposition.

Samson-United Corporation, Rochester, N. Y., has opened a New York office in the Fifth Ave. Bldg., 200 Fifth Ave. A. A. Berman has been appointed manager and D. Koblenzer, assistant manager.

PERSONALS

E. S. Conrad, who has been coast district manager for the Square D Co. for ten years, has been appointed general sales manager of the Diamond Electrical Manufacturing Co., which is affiliated with the Square D Co. He will have charge of sales in the eleven western states.



Brig. Gen. E. D. Bricker
New assistant chief of ordnance, U. S. Army

R. C. Force, president of the Caterpillar Tractor Co., Peoria, Ill., since the formation of the present company, has been elected chairman of the board. B. C. Heacock, vice-president, succeeds Mr. Force as president.

Charles Kamdel, general manager of the Craftsweld Equipment Corporation, Philadelphia, presented a paper entitled "Development of the Ellsberg S-51 Underwater Cutting Torch" prepared by Commander Edward Ellsberg of the U. S. Navy, at a meeting of the local section of the American Welding Society on Sept. 15. Motion pictures of the raising of the submarine S-51 were also presented.

Jules Dierckx sailed on Sept. 20 for a short visit to Europe.

Prof. C. Derleth, Jr., is dean of the reorganized engineering colleges of the University of California, Berkeley. Prof. B. M. Woods is to head the mechanical engineering department, while Prof. L. F. Fuller is to have charge of the electrical engineering department.

Gordon F. Daggett has been appointed branch manager for the Wisconsin territory of the Stephens-Adamson Manufacturing Co., Aurora, Ill. He will be located at 735 Briarwood Place, Milwaukee.

John Christensen of the Cincinnati Gear Co., Cincinnati, Ohio, and Mrs. Christensen, have just returned from a European trip which included Norway, Sweden, Denmark, Germany, and Austria.

C. J. Edwards, Detroit, has been elected president of the Wheeler Metal Products Corporation, Detroit, to succeed W. H. Ritter, New Haven, Conn., resigned.

Richard Ferguson, president of the Ferguson Gear Co., Gastonia, N. C., was recently elected president of the Turner Manufacturing Co., Statesville, N. C.

E. S. Kaylor, Pekin, Ill., has acquired the interests of S. L. McKinney, whose patents are used exclusively by the Elevators Lock Co., 119 North Washington St., Peoria, and becomes president and treasurer. Mr. McKinney is retiring from industrial life to devote his attention to his other business interests.

C. Roy Keys, vice-president and general manager of the Curtiss Aeroplane & Motors Corporation, Buffalo, resigned recently. He will be succeeded by William S. Leaycroft, now treasurer.

B. H. MacNeal has been appointed southern district manager of the crane, shovel, and dragline division of the Link-Belt Co., Chicago. His headquarters will be at the Birmingham (Ala.) office.

T. A. Maloney, formerly superintendent of the wheel and gray iron foundries, Mt. Vernon (Ill.) Car Manufacturing Co., has resigned to become a member of the sales and service department, St. Louis Gas & Coke Corporation.

Dr. Fritz W. Meyer, vice-president of the Mississippi Valley Research Laboratories, St. Louis, and well-known foundry consultant and metallurgist, sailed recently for Europe.

W. A. Nugent, manager of the St. Louis office, Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, will be transferred to Chicago as manager of the Chicago territory. F. J. Passino, manager of the Pittsburgh office, will be located in St. Louis as manager of that territory. T. J. Clancy, of the Cleveland office, will be transferred to Pittsburgh as manager.

Arthur R. Bullock, Lakewood, Ohio, has been made secretary and manager of the Elyria (Ohio) Magnesium Products Co.

W. A. Roberts, formerly vice-president of I. G. Haug & Sons, Regina, Sask., Canada, has been appointed agricultural sales manager, tractor division, Allis-Chalmers Manufacturing Co., Milwaukee.

F. H. Chapin, president of the National Acme Co., 170 E. 131st St., Cleveland, Ohio, sailed for Europe on Sept. 5 on a five-week business trip. Most of Mr. Chapin's time will be spent in Germany, although he will

spend some time in France and England. The purpose of the trip is to make new connections regarding foreign representation of the National Acme Co. and to seek additional outlets for trade.

Paul Shirley, superintendent of the Denver Ford plant, has been appointed manager to succeed Emory Afton, who resigned recently. Mr. Shirley has been associated with the local Ford plant for 14 years. Fred E. Lundstrom, formerly assistant manager of the Twin Cities Ford plant, St. Paul, Minn., was recently transferred to the Portland, Ore. branch plant, becoming manager to succeed C. A. Bullwinkel.

George M. Smith, formerly general superintendent of the South Chicago Works, Interstate Iron & Steel Co., Chicago, has resigned.

Charles Snyder has been appointed general superintendent of the Olean Metal Cabinet Works, Inc., Olean, N. Y., which began operations early in August in a $100,000 plant.

J. S. Sussman, former president of Steel & Tubes, Inc., and R. K. Senter have incorporated the Pipe & Tube Products Corporation, with offices at 3701 Woolworth Bldg., New York.

Thomas J. Watson, president, International Business Machines Corporation, New York, returned on Sept. 12 from a three-months' European business trip.

J. K. Webb, 601 Allen Bldg., Dallas, Texas, has been appointed district sales agent for the State of Texas by the Roller-Smith Co., 233 Broadway, New York, N. Y.

The Marchese Guglielmo Marconi, inventor of wireless telegraphy and Italy's most famous scientist, has been named a member of the Italian Academy, and is expected to be appointed president of the academy by Premier Mussolini to succeed Signor Tittoni.

OBITUARIES

Frank R. Ford, 58, a member of the consulting firm of Ford, Bacon & Davis, 39 Broadway, New York, N. Y., of which he was a founder in 1894, died on Sept. 17 in New York City. He was a director and former president of the L. C. Smith & Corona Typewriters, Inc.

Theodore I. Jones, 51, head of the consulting engineering firm of T. I. Jones, Inc., New York, died at Newark, N. J., on Sept. 12. Mr. Jones was formerly a vice-president of the American Flexible Shaft Manufacturing Corporation, New York.

Frank R. Ellis, 85, recently retired president of the Shadbolt & Boyd Iron Co., Milwaukee, was fatally injured by an automobile on Sept. 5 and died the following day. He had been associated with the company for 55 years.

H. J. Yount, 66, president of the Eagle Machine Co., Indianapolis, Ind., died recently in Battle Creek, Mich., after an illness of two weeks.

James J. Dimeo, formerly general manager of the Batavia, N. Y., plant of the Doehler Die Casting Co., died recently at his home in Cleveland, O., following a long illness from tuberculosis.

Francis Stanley North, 55, president of the Union Special Machine Co., Chicago, died on Sept. 9 in Boston following a long illness. He was the son of William S. North, founder of the company, and became its president in 1913.

James Neill, 73, died recently at Ranmoor, Sheffield. Mr. Neill was founder and chairman of James Neill & Co., (Sheffield), Ltd., and also a director of the Tinsley Rolling Mills Co., Ltd., Tinsley, England.

W. F. Hutchinson, 33, general manager of the Rud Machine Co., a subsidiary of the Pioneer Steamship Co., Cleveland, was killed in an automobile accident on Sept. 11.

Edmund H. Jones, 65, president and general manager of the Cleveland Folding Machine Co., died on Sept. 11.

Oscar E. Leighton, 48, president and general manager of the Ajax Spring Stabilizer Co., Boston, Mass., died on Sept. 17 in that city.

Matthew H. Stoll, 41, president and general manager of the Stoll Manufacturing Co., La Crosse, Wis., died at his home in that city on Sept. 12 after an illness of more than six months.

FORTHCOMING MEETINGS

NATIONAL SAFETY CONGRESS—Nineteenth Annual, to be held at Fort Pitt and William Penn Hotels, Pittsburgh, from Sept. 29 to Oct. 3. Metals Section meetings will be held on Tuesday and Wednesday mornings and Thursday afternoon.

AMERICAN GEAR MANUFACTURERS' ASSOCIATION — Semi-Annual meeting, Hotel Clifton, Niagara Falls, Ont., Canada, from Sept. 29 to Oct. 1.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Calvin W. Rice, executive secretary, Engineering Societies Bldg., 29 West 39th St., New York, N. Y. The following meetings are scheduled:

French Lick Meeting, French Lick Springs Hotel, French Lick, Ind., Oct. 13-15.

Fifty-first annual meeting, Engineering Societies Bldg., Dec. 1-5.

Semi-Annual meeting, Birmingham, Ala., Apr. 20-23, 1931.

National Materials Handling Meeting and Management congress, Cleveland, Ohio, Apr., 1931.

National Aeronautic Meeting, Baltimore, Md., May, 1931.

SOCIETY OF AUTOMOTIVE ENGINEERS — Production meeting, Hotel Book-Cadillac, Detroit, Oct. 7-8. R. S. Burnett, director, production activities, 29 West 39th St., New York City.

GRAY IRON INSTITUTE, INC. — Third Annual Convention at Hotel Cleveland, Cleveland, Ohio, October 8. Arthur J. Tuscany, Terminal Tower Bldg., Cleveland, is manager.

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION—29th Annual Convention, Hotel Aspinwall, Lenox, Mass., October 13-15. Ernest F. DuBrul, 1415 Enquirer Bldg., 617 Vine St., Cincinnati, Ohio, is general manager.

SOCIETY OF INDUSTRIAL ENGINEERS—17th National Convention, Mayflower Hotel, Washington, D. C., Oct. 15-17. George C. Dent, 1815 Engineering Bldg., 205 W. Wacker Drive, Chicago, executive secretary.

STEEL FOUNDERS' SOCIETY OF AMERICA—October meeting at Pennsylvania Hotel, New York City, on Oct. 23, the day preceding the New York meeting of the American Iron & Steel Institute. G. P. Rogers, 932 Graybar Bld., New York City, is managing director.

NINTH NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING —In Grand Central Palace, New York City, Dec. 1-6. Charles F. Roth, manager, Grand Central Palace.

WESTERN METAL CONGRESS AND EXPOSITION—Second National, Civic Auditorium, San Francisco, Calif., Feb. 16-20, 1931. Under auspices of A.S.S.T. W. H. Eisenman, secretary, 7016 Euclid Ave., Cleveland, Ohio.

THE INDUSTRIAL REVIEW

Weekly progress of the machinery and machine-tool business

THE following reports, gathered from the various machinery and machine-tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

NEW YORK

New York's dealers, beginning to wish Manhattan had been built without a street called Wall, are retaining their optimism and are still scratching for orders. Although they do not expect to attain 1929 levels for many a day, they are hoping to turn up enough business to turn up the sales curve. Results for their week's work were comparative to those of the week before—some orders and inquiries, usually for single tools. The Navy is inquiring for tools for San Francisco, but there are few other inquiries for more than a tool or two. Westinghouse has received several fair-sized orders, and RCA-Victor has raised its working force from 4,000 to 22,000, but most sources of orders remain undiscovered.

DETROIT

While renewed optimism has become apparent in many lines of business, there is still little tangible improvement in the machinery and machine-tool trade. A few more inquiries than usual have come in during the past ten days and there have been some small deals closed.

Automobile manufacturers seem reluctant to make purchases, except in cases where their needs are immediate. A campaign of sales stimulation is being undertaken by them. Should the buying deadlock be broken, it is likely that all of the long-deferred orders for tools will begin to drift to the dealers.

NEW ENGLAND

New England industry registered enough improvement during the week to substantiate the belief that an actual turn for the better has really been made. Several manufacturing centers show marked improvement. The radio industry is swinging rapidly into something near a normal stride. The outlook for the machine-tool industry from this source is particularly promising in the Boston and Providence territory and sections of Connecticut.

More life has been displayed by the automotive industry, but conditions are still very much below par. Electrical manufacturers are resuming full schedules more rapidly than other lines of endeavor. Aeronautical plants are quiet with the exception of those engaged in government work.

CLEVELAND

Business in the local machine-tool trade is showing definite signs of recuperating from a very sick summer. It is the prevailing opinion that Dr. Optimist, with his sun rays, is gradually breaking through the dark clouds. Sales for the week were slightly greater in number. A larger number of inquiries was received. Sales of a boring mill, a grinder, and several smaller items to automobile manufacturers are reported.

The Cleveland Tractor Co. has received quotations on industrial furnaces and is about to issue a list of machine tools. The Youngstown Sheet & Tube Co. bought a few items. The Timken Roller Bearing Co., Canton, is preparing a list for early issuance. The Cleveland School Board closed for a list and will soon readvertise for four lathes for the East Tech High School. Automatic manufacturers also show slightly better business.

SPOTTY as a leopard, and almost as treacherous, machinery and machine-tool markets of the country are on the stairs from basement to belfry. Seemingly, it is going to be an arduous trip, but at least the start has been made. New York dealers, scratching for orders, are getting just about enough to feed the chicks and scare off the hawk. Detroit, hopefully receiving a few more inquiries, is looking with longing eyes at the automotive industry, which has been hanging onto even its small change for so long that the eagles are beginning to look tired.

NEW ENGLAND, considered a model of Yankee canniness, has several districts showing marked improvement, with electrical manufacturing leading the procession. Cleveland, a veritable Pollyanna, quotes a number of concrete cases to prove that business there is recuperating from a very sick summer. Cincinnati manufacturers, not so many miles to the south, remain unaffected by Cleveland's attitude, and even seem just a wee bit disgruntled with the cheerful selling agents there. In Milwaukee, two weeks of September have equalled all of August in some cases, and last week was the year's best in at least one.

PHILADELPHIA apparently shares New England's interest in Fresh Air Taxicabs, and the shipbuilding industry seems to have taken Enterprise's win seriously, though the other transportation industries are like New England's—slow. Chicago, watching a slow upturn, is saying, "The World's Fair—just fair." Southern District sales are becalmed. New designs of equipment reported in *American Machinist* is 133 per cent of normal.

Local automobile parts manufacturers have been recipients of important orders from Lycoming, Cadillac, Chrysler, and Buick and are increasing production. The Republic Steel Corporation has received an order for 110 miles of welded steel pipe.

CINCINNATI

Machine-tool manufacturers of the Cincinnati district report low demand from the general market. A few received a little more business than in the previous week, but this was not enough to make any material change in the situation.

Manufacturers' sales were confined largely to single tools and replacements, principal buyers being general machinists and miscellaneous small users, located in all sections of the country.

Selling agents, while having few orders, are encouraged by a number of inquiries.

MILWAUKEE

While there has not been much improvement, indications point to a gain in September. One of the large manufacturers reported that business for the first half of September was equal to that of the entire month of August. General sentiment here is that the depression has reached its low point and that the curve is again upward. Even though the actual placing of orders is still light, considerable optimism is being shown. Not only are numerous inquiries being received, but a few orders are being placed. Last week one machine-tool producer received more orders than during any one week so far this year.

More men are being added to the payrolls of several local manufacturers who are optimistic enough to back up their predictions of real improvement from now on.

PHILADELPHIA

Dullness in the machinery and machine-tool business which has characterized the market for several months, continued during the last two weeks, with little indication there will be a change for the better at any early date. The prediction made by some spokesmen for the industry that Sept. 1 would witness a return to something like normal appears to have been unjustified.

Radio and shipbuilding seem to have a more hopeful future than other lines. Officials of the Philco Co. announced an increase in output, and activities at the plant of RCA-Victor in Camden, N. J., continues. Philco expects to make daily additions until it has a force of 5,000. No indications of early activities of railroad buying has been apparent, and the aircraft industry, also, appears to be dormant.

CHICAGO

Very much the same conditions prevail in the machine-tool market as were noted a week ago. General improvement then indicated as perceptible has continued, although the upward trend is not sufficiently marked as to warrant the belief that a period of activity is to be expected for some weeks to come. Inquiries continue to increase, and the closing of a few sales is reported. The Illinois Steel Co. within the last week has added several tools to its recent list of inquiries. From the C. B. & Q. R.R. comes an inquiry for a 21-in. sliding-head drill. The International Harvester Co. is in the market for an automatic cutting-off machine. The Household Utilities Co., whose requirements were thought to have been about filled, finds it necessary to make additions to the equipment for its new plant.

SOUTHERN DISTRICT

Little hope is held out in this district for a change of existing conditions during the next few months. Machinery and machine-tool sales continue slow and far behind optimistic expectations of a month or so ago. All chief industrial centers of the South report inactive buying. Sales for the most part are not being pushed to excess, due largely to the necessary contraction of credits. Used machinery and equipment continues to be the mainstay of the trade, while the bulk of sales is centered about small tools.

Buying continues diversified, both as to industries and geographic locations. In the Houston area, where sales up to recently were satisfactory, a sudden dullness has crept in; New Orleans dealers report business slow, and in the Birmingham district quietness prevails. It is needless to say that Georgia and Florida are quiet, and reports from the latter are by far the most discouraging of the district.

BUSINESS · BAROMETER

Most positive evidence of American business improvement is increasing exports

THEODORE H. PRICE
Editor, Commerce and Finance, New York

THOSE who have been seriously ill realize that convalescence is a trying experience. There are good days and bad days, and the sick man sometimes doubts whether he will ever get well. But the curative power of nature is wonderful, and despite his despondency the patient generally recovers if he has a good constitution.

These observations are suggested by last week's financial and commercial news. The sufferer is getting better. On one or two days of last week he showed some weakness, but he soon recovered himself, and he now seems to be quite cheerful and comfortable.

In medicine, great progress has been made in the study of disease. As a result the span of human life has been substantially extended. The same thing is true of business. The great war compelled all business men to become close students of financial conditions, and they and their bankers are now able to handle business disorders with more intelligence than formerly. Acute panics have become archaic, and periods of depression are likely to be very much shorter than used to be the case.

The recovery that is just now making itself felt in the world of business vindicates the above statement despite the opposition of the pessimists to an optimistic interpretation of current news.

Perhaps the feature of the situation is the effort to avert a further decline in commodity prices that is being made all over the world. In an attempt to advance the price of sugar, a committee of New York bankers is now trying to arrange some sort of understanding with the Javanese and Cuban sugar planters, who produce practically all the world's exportable surplus. A similar effort is being made in behalf of Brazilian coffee, the price of which is now under six cents a pound for No. 7 Rios. A renewed effort to combine the Dutch and English producers of rubber is reported and the policy of holding is being widely adopted by the American cotton planters. The banks, as well as the government, are offering to lend to those cotton farmers who want to borrow. The Japanese government has bought large quantities of silk. And even in the market for American wheat, in which no effort at price-fixing is being made directly, the government financed Stabilization Corporation is carrying a large quantity.

Just what the result will be remains to be seen. Any attempt to interfere with the law of supply and demand is regarded by many as futile. There are, however, a great many others who believe that it is practicable to abate some of the hardships for which the law of supply and demand is responsible, and it is altogether probable that the subject will soon become a political issue of major importance.

Last week's market for stocks and bonds was a convalescent one. It was alternately weak and strong, but the predominant tendency was upward, and is likely to continue so long as money is easy. There are some who disparage the bullish effect of cheap money, just as there were some who contended that the high interest rates which ruled a year ago were an indication of the country's prosperity and an argument in favor of higher prices. Such theories are, however, fallacious. The truth is that dear money is a danger signal, while cheap money should be regarded as an incentive to enterprise. It may not be immediately effective, but its pressure will ultimately lead to a revival of activity, and a decided improvement in business. Something of this sort is happening in the United States at present, and its effect is also being felt in France and in England, where the low rates at which credit is obtainable are commencing to quicken commercial as well as financial activity.

The one unsettling piece of news that is reported from abroad is the German election. It has resulted in greatly increasing the representation of the Fascists and Communists—the extreme "right" and the extreme "left"—in the Reichstag. The weakening of the "moderates" seems to have caused more or less nervousness in Europe, and further developments will be watched with very keen interest.

In the United States the most positive evidence of business improvement is to be found in the exports for August. They show a substantial increase over the shipments for July, 1930, although still under the figures for August, 1929. But the chart is now curving upward, and its upward curve is all that America needs to re-inspire the enthusiasm that is coming to be felt in many directions. Other items of a similar import are the increased sales reported this month by the department and chain stores, as well as the mail-order concerns whose business appears to have been greatly stimulated by the lower prices quoted in their latest catalogs, issued about a month ago.

The steel industry is looking up, but the most reliable information fails to indicate any great increase in the sales of automobiles. Copper has declined to 10½ cents a pound, where it seems pegged by a demand which is said to reflect the confidence of big people in the value of the metal at present low prices.

THE BUSINESS WEEK

September 24, 1930

THERE is no longer any doubt that the resistance level of this depression was reached some time in August. The only question now is as to the speed, vigor and permanence of the recovery during the remainder of the year. There are but six more weeks to go to the peak of the fall seasonal movement. This hill has to be taken on high to short-cut a stretch of rough and slow going this winter. The get-away so far in September has been somewhat slow, but the first two weeks have shown slightly more than seasonal improvement. After getting past the holiday drag, our preliminary index for the week ending September 13th turned upward from 83.3% of normal to 84.3%. Basic industrial activity is increasing slowly, building projects are somewhat more active, primary distribution and general trade are showing fair seasonal expansion, commodity prices are definitely settling into stability, preparing for an upturn as forward buying becomes more active. Bear pressure encounters more steady resistance in a quiet stock market and in undervalued wheat and cotton. But passive Federal Reserve policy is letting precious moments slip by. As member banks cease buying bonds to prepare for fall commercial credit requirements, the Reserve must begin aggressive open market action immediately to avoid a winter of discontent.

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THE WEEKLY PRICE GUIDE . . . .S

Rise and Fall of the Market

SHOPS at Birmingham are turning out fabricated structurals in good volume; the same holds true of oil-tank plate producers. A Youngstown pipe plant has all units of its electric welding equipment at full capacity, the product being destined for shipment to Southwestern natural gas interests. Still another sign of activity is seen in the briskness of current tinplate shipments—and this following reports of the destructiveness of the recent drought. Sparseness of buying persists in the iron trade, with no stocks accumulating. Gray-iron machinery castings are now quoted at 4¾@5c. per lb. at New York, compared with 5¼c., formerly. In the non-ferrous group, copper continues quiet; tin demand is at low ebb; lead prices remain steady, despite plentitude of metal; zinc decline appears to have ceased. Fabricated brass and copper prices dropped about ¼c. per lb. this week at New York and Cleveland.

(*All prices as of September* 19, 1930)

IRON AND STEEL

PIG IRON—Per gross ton, f.o.b.:

CINCINNATI	
No. 2 Southern (silicon 1.75@2.25)	$16.69@$18.19
Northern Basic	19.89@ 20.39
Southern Ohio No. 2	19.89@ 20.39
NEW YORK—Tidewater Delivery	
No. 2 Southern (silicon 1.75@2.25)	18.00@ 18.50
BIRMINGHAM	
No. 2 Foundry (silicon 1.75@2.25)	14.00
PHILADELPHIA	
Eastern Pa., No. 2x (silicon 2.25@2.75)	20.00
Virginia No. 2	18.75@ 19.25
Basic	22.29
CHICAGO	
No. 2 Foundry, local (silicon 1.75@2.25)	19.00
No. 2 Foundry, Southern (silicon 1.75@2.25)	18.20
PITTSBURGH, including freight charge ($1.76) from Valley:	
No. 2 Foundry	19.63@ 20.13
Basic	19.63@ 20.13
Bessemer	20.76

IRON MACHINERY CASTINGS—Cost in cents per lb. of 100 flywheels, 6-in. face x 24-in. dia., hub not cored, good quality gray iron, weight 275 lb.:

Detroit	4.50
Cleveland	4.75
Cincinnati	4.45
New York	4.75@5.00
Chicago	4.50@4.75

SHEETS—Quotations are in cents per pound in various cities from warehouse; also the mill base in large lots:

Blue Annealed*	Pittsburgh Mill Base	Chicago	Cleveland	New York
No. 10	1.90@2.00	3.35†	3.00	3.40†
No. 12	1.95@2.05	3.45†	3.10	3.45†
No. 14	2.05@2.15	3.55†	3.20	3.50†
No. 16	2.15@2.25	3.65†	3.30	3.60†
Black				
Nos. 18 to 20	2.15@2.25	3.60†	3.40	3.70
No. 22	2.30@2.40	3.75†	3.55	3.85
No. 24	2.35@2.45	3.80†	3.60	3.90
No. 26	2.45@2.55	3.90†	3.70	4.00
No. 28	2.60@2.70	4.05†	3.85	4.15
Galvanized				
No. 10	2.30@2.40	3.65†	3.65	3.55
Nos. 12 to 14	2.40@2.50	3.75†	3.75	3.65
No. 16	2.50@2.60	3.85†	3.85	3.75
No. 18	2.65@2.75	4.00†	4.00	3.90
No. 20	2.80@2.90	4.15†	4.15	4.05
No. 22	2.85@2.95	4.20†	4.20	4.10
No. 24	3.00@3.10	4.35†	4.35	4.25
No. 26	3.25@3.35	4.60†	4.60	4.50
No. 28	3.50@3.60	4.85†	4.85	4.75

*Light Plates. †400 to 3,999 lb.

WELDED STEEL PIPE—Warehouse discounts are as follows:

	New York Black	New York Galv.	Cleveland Black	Cleveland Galv.	Chicago Black	Chicago Galv.
1 to 3 in. butt	56.14%	43.6%	53.3%	42.3%	57.3%	44.8%
3½ to 6 in. lap	52.72%	40.18%	50.8%	37.8%	53.9%	41.4%

WROUGHT-STEEL PIPE LIST

Size, Inches	List Price per Foot	Diameter in Inches—External	Diameter in Inches—Internal	Thickness Inches
1	$0.17	1.315	1.049	.133
1¼	.23	1.66	1.38	.14
1½	.27½	1.9	1.61	.145
2	.37	2.375	2.067	.154
2½	.58½	2.875	2.469	.203
3	.76½	3.5	3.068	.216
3½	.92	4.0	3.548	.226
4	1.09	4.5	4.026	.237
5	1.48	5.563	5.047	.258
6	1.92	6.625	6.065	.28
8	2.50	8.625	8.071	.277

SEAMLESS STEEL TUBING—Following net prices are for seamless mechanical tubing, cold drawn, round, .10 to .30 carbon, at New York warehouse in lots of less than 100 ft. or 100 lb.:

Thickness—Decimal	B.w.g. and Fractions	Outside Diameter in Inches—½	⅝	¾	⅞	1	1¼	1½
		Price per Foot						
.035"	20	$0.15	$0.16	$0.17	$0.18	$0.19	$0.21	$0.23
.049"	18	.17	.18	.19	.20	.21	.23	.25
.065"	16	.19	.20	.21	.22	.23	.25	.27
.083"	14	.20	.22	.23	.24	.25	.27	.29
.095"	13	.21	.23	.25	.26	.27	.29	.31
.109"	12	.22	.24	.26	.27	.28	.30	.32
.120" or .125"	11	.23	.25	.27	.28	.29	.31	.33
.134"	10	.24	.26	.28	.29	.30	.32	.34

MISCELLANEOUS—Warehouse base prices in cents per lb.:

	New York	Cleveland	Chicago
Spring steel, light*	4.50	4.65	4.65
Spring steel, heavier	4.00	4.00	4.00
Coppered Bessemer rods	7.00	6.00	6.15
Hoop steel	3.75†	4.00	3.75†
Cold rolled strip steel	4.95	6.00	6.10
Floor plates	4.85†	5.30	5.00†
Cold fin., round or hexagon‡	3.40	3.65	3.35
Cold fin,, flat or square‡	3.90	4.15	3.85
Structural shapes	3.10†	3.00	3.00†
Soft steel bars	3.10†	3.00	3.00†
Soft steel bar shapes	3.10†	3.00	3.00†
Soft steel bands	3.40†	3.65	3.20†
Tank plates	3.10†	3.00	3.00†
Bar iron (2.75 at mill)	3.24	3.00	3.00
Drill rod (from list)	60%	55%	50%

*Flat, 3/16-in. thick by ¾-in. wide. †400 to 3,999 lb., ordered and released for shipment at one time. ‡Cold finished steel, shafting and screw stock.

Electric welding wire at New York warehouse—3/32, 8.35c. per lb.; ⅛, 7.85c. per lb.; 5/32 to ½, 7.35c. per lb.

METALS

Warehouse Delivery Prices in Cents Per Lb. for Small Lots:

Copper, electrolytic, New York			12.50
Tin, Straits, pigs, New York			32.00@33.00
Lead, pigs, E. St. Louis	5.35	New York	6.50@7.00
Zinc, slabs, E. St. Louis	4.25	New York	6.25@7.25

	New York	Cleveland	Chicago
Antimony, slabs	10.00@10.50	11.00	10.75
Copper sheets*	20.50	20.50	20.75
Copper wire*	13.00	13.12½	13.12½
Copper, drawn, round*	19.00	19.00	19.25
Copper tubing*	22.75	22.75	23.00
Brass sheets, high*	17.62½	17.62½	17.87½
Brass tubing, high*	22.50	22.50	22.75
Brass rods, high*	15.87½	15.87½	16.12½
Brass wire, high*	18.12½	18.12½	18.37½

*Mill, base.

SHOP MATERIALS AND SUPPLIES

METALS—Continued

	New York	Cleveland	Chicago
Aluminum ingots, 99%†	23.30	24.30	23.30
Zinc sheets (casks)	9.75@10.25	11.25	10.11
Solder (½ and ½)	24.50	23.50	22@24
Babbitt metal, delivered in case lots, New York, cents per lb.:			
Genuine, highest grade			50.00
Commercial genuine, intermediate grade			37.00
Anti-friction metal, general service			31.00
No. 4 babbitt, f.o.b.			10.50

†F.O.B.

NICKEL AND MONEL METAL—Price in cents per lb., base, f.o.b. Huntington, W. Va.:

	Nickel	Monel Metal
Sheets, full finished	52.00	42.00
Sheets, cold rolled	60.00	50.00
Strip, cold rolled	55.00	45.00
Rods, hot rolled	45.00	35.00
Rods, cold drawn	50.00	40.00
Tubing	75.00*	90.00†
Angles, hot rolled	50.00	40.00
Plates	52.00	42.00

*Seamless. †Welded

OLD METALS—Dealers' purchasing prices in cents per pound, f.o.b. cars:

	New York	Cleveland	Chicago
Crucible copper	9.00 @9.25	9.00	8.75@ 9.25
Copper, heavy, and wire	8.25 @8.50	8.75	8.00@ 8.50
Copper, light, and bottoms	7.50 @7.75	8.50	7.00@ 7.50
Heavy lead	4.25 @4.37½	4.00	3.50@ 4.00
Tea lead	2.00 @2.25	2.50	2.50@ 3.00
Brass, heavy, yellow	5.25 @5.50	5.00	5.00@ 5.50
Brass, heavy, red	7.25 @7.50	7.75	7.25@ 7.75
Brass, light	4.25 @4.50	4.00	4.50@ 5.00
No. 1 rod-brass turnings	5.37½@5.50	5.00	5.00@ 5.50
Zinc	2.00 @2.25	1.50	1.75@ 2.00

TIN PLATES—Charcoal—Bright—Per box:

	New York	Cleveland	Chicago
"AAA" Grade:			
IC, 14x20	$12.10	$11.95	$11.50
"A" Grade:			
IC, 14x20	9.70	9.90	9.50
Coke Plates—Primes—Per box:			
100-lb., 14x20	6.45	6.10	7.00
Terne Plates—8-lb. Coating—Small lots—Per box:			
IC, 14x20	7.75@8.00	7.00	7.50

MISCELLANEOUS

	New York	Cleveland	Chicago
Cotton waste, white, per lb.	$0.13	$0.16	$0.15
Cotton waste, colored, per lb.	.09½	.12	.10
Wiping cloths, washed, white, per lb.	.13½	38.00 per M	.14½
Sal soda, per lb.	.01½	.02	.02
Roll sulphur, per lb.	.028	.03½	.04
Linseed oil, raw, in 1 to 4 bbl. lots, per lb.	.122	.141	.113
Cutting oil, about 25% lard, in 5 gal. cans, per gal.	.65	.60	60
Machine oil, medium-bodied (55 gal. steel bbl.) per gal.	.33	.36	24
Belting—Present discounts from list in fair quantities (½ doz. rolls) for leather or rubber:			
Leather—List price, 24c. per lin.ft., per inch of width, for single ply:			
Medium grade	30–10%	30–10%	35%
Med. grade, heavy wgt.	30%	30 –5%	30%
Rubber transmission, 6-in., 6 ply, $1.83 per lin.ft.:			
First grade	50%	50–10%	50%
Second grade	60%	60– 5%	50–10%

Comparative Warehouse Prices

New York	Unit	Current Price	Four Weeks Ago	One Year Ago
Soft steel bars	per lb.	$0.031	$0.031	$0.033
Cold fin. shafting	per lb.	.034	.034	.036
Brass rods	per lb.	.1587½	.1612½	.2125
Solder (½ and ½)	per lb.	.245	.245	.33
Cotton waste, white	per lb.	.13	.13	.10@.13½
Disks, aluminum oxide mineral, cloth, No. 1 6-in. dia.	per 100	4.59	4.59	3.60
Lard cutting oil	per gal.	.65	.65	.75
Machine oil	per gal.	.33	.33	.33
Belting, leather, medium	off list	30–10%	30–10%	30–10%
Machine bolts, up to 1x30 in., full kegs	off list	65%*	65%*	50–10%*

*List prices as of April 1, 1927

MISCELLANEOUS—Continued

	New York	Cleveland	Chicago
Abrasive materials — Standard grade, in sheets 9x11 in., No. 1, per ream of 480 sheets:			
Flint paper*	$6.03	$6.03	$6.03
Emery cloth*	25.87	25.87	25.87
Disks, aluminum oxide mineral, 6 in. dia., No. 1, per 100:			
Paper†	2.61	2.61	2.61
Cloth†	4.59	4.59	4.59
Fire clay, per 100 lb. bag	1.00	.75	75
Coke, prompt furnace, per net ton	Connellsville,		2.60
Coke, prompt foundry, per net ton	Connellsville,		3.50@4.85
White lead, dry	100 lb. kegs	New York,	13.75
White lead, in oil	100 lb. kegs	New York,	13.75
Red lead, dry	100 lb. kegs	New York,	13.75
Red lead, in oil	100 lb. kegs	New York,	15.25

*Less than 3 reams. †Less than 200.

SHOP SUPPLIES

Discounts from new list dated Apr. 1, 1927, applying on immediate deliveries from warehouse stocks in New York and vicinity:

Machine bolts:	
Up to ¾-in. x 6-in., full kegs, list less	65%
Larger, up to 1 x 30-in., full kegs, list less	65%
Less than full kegs or case lots, add to list	10%
Fitting-up bolts: list less	45%
Lag screws:	
Up to ½-in. x 6-in., list less	65%
Larger, list less	65%
Less than full keg or case lots, add to list	10%
Rivets:	
Structural, round head, full kegs, net	$4.50
Structural, round head, broken kegs, net	6.00
Tank, 7/16-in. dia. and smaller, list less	65%
Nuts:	
Hot pressed, square or hexagonal, blank or tapped:	
Full kegs up to 1-in., incl., list less	65%
Larger, up to 3-in., list less	65%
Less than keg or case lots, add to list	10%
Washers:	
Wrought, full kegs, per 100 lb., list less	$4.00
Wrought, broken kegs, per 100 lb., list less	2.00
Turnbuckles:	
With stub ends, list less	20–10%
Without stub ends, list less	55%
Chain:	
Proof coil, base, per 100 lb., net	$8.50
Cast iron welding flux, per lb., net	.35
Bronzing flux, per lb., net	.50

MACHINE REQUIREMENTS AND INDUSTRIAL CONSTRUCTION

Equipment Wanted

Ill., Springfield—Hummer Plow Works—18 to 24 in. sander, single oscillating drum, power feed.

Mass., Boston — Bureau of Supplies & Accounts, Navy Dept., Washington, D. C.—will receive bids until Sept. 30 for woodworking machinery for Navy Yard, here.

Mass., Reading—P. O. Box 96—16 x 6 in. engine lathe, bench lathe and collets, milling machine, power press, shaper, drill presses and small tools.

Mich., Detroit—Leland Detroit Mfg. Co., 5945 Martin Ave.—drill, spindle and tapper.

Mo., St. Louis—St. Louis Screw & Bolt Co., E. J. Miller, Pres., 6900 North Broadway—40 ton, open hearth furnace and auxiliary equipment for proposed 1 story, 180 x 240 ft. addition to plant. Estimated cost $250,000.

O., Cincinnati—Boye & Emmes Machine Tool Co., 2245 Spring Grove Ave.—6 ton bridge crane for proposed 1 story, 120 x 260 ft. factory on Caldwell Dr. Estimated cost $75,000.

O., Cleveland — Bd. of Education, Standard Trust Bldg., C. Boppel, Purch. Agt.—will soon receive bids for four 14 in. x 6 ft. lathes for East Technical high school.

O., Cleveland — Cleveland Tractor Co., East 193rd St. and Euclid Ave.—industrial furnace.

Wash., Seattle — Ford Motor Co., 3674 Schaefer Rd., Dearborn, Mich. — crane, conveyors, elevator and general assembly line equipment for proposed 1 and 2 story assembly plant, here. Estimated cost $500,000.

Ont., Hamilton—Norton Co. of Canada Ltd., 3 Beach Rd.—machinery and equipment for the manufacture of abrasives for proposed 3 story 50 x 50 ft. addition to factory.

Opportunities for Future Business

Ark., Benton—Arkansas Hospital for Nervous Diseases, c/o State Construction Commission, J. M. Hill, Fort Smith, Chn., is having plans prepared for a group of hospital buildings including garage and repair shop, etc., here. Mann, Wanger & King, Donahgey Bldg., Little Rock and S. W. Jones & Associates, 25 West 45th St., New York, N. Y., Assoc. Archts., Lund Engineering Co., Home Insurance Bldg., Little Rock, Engr.

Calif., Wilmington — Pacific Fiber & Cordage Co., 2740 Pacific St., San Pedro, had plans made for a 1 story, 60 x 150 ft. factory, here. Estimated cost $100,000. Private plans.

Conn., Waterbury—Waterbury Buckle Co., C. M. Webb, 872 South Main St., is receiving bids for the construction of a 4 story, 70 x 112 ft. factory on South Main St. Estimated cost $100,000. J. DeLauritis, 94 Benedict St., Archt.

Idaho, Wallace — Jack White Mining Co., plans to drive 500 ft. tunnel shaft, reconstruct mill and build 4 mi. railroad. Estimated cost $380,000.

Ill., Libertyville—Nimrod Co., has work under way on a new 1 story factory for the manufacture of hunting and sporting goods. Estimated cost $60,000.

Ind., Elkhart—H. E. LaBour Foundry Co., will build a foundry at 1537 Sterling Ave. Estimated cost $41,000. Private plans. Work will be done by owners forces.

Ind., Hammond — Hammond Lead Products Co., awarded contract for the construction of a factory at 1200 Standard Ave. Estimated cost $100,000.

Ind., Indianapolis—Pure Oil Co., 1951 Madison Ave., awarded contract for the construction of a super service station and shop at 619 East Washington St. Estimated cost $40,000.

Me., Peru—Berst-Forster Dixfield Co., N. C. Beale, Pres., awarded contract for a 1 story, 100 x 146 ft. factory for the manufacture of wood products. $40,000. Also 1 story, 65 x 155 ft. factory at Dixfield. $40,000.

Me., Westbrook—Portland Water District, 16 Casco St., awarded contract for the construction of a 2 story service garage, shop, etc. Estimated cost $40,000. Noted Sept. 11.

Md., Baltimore — City Baking Co., 308-324 North Gay St., awarded contract for a 1 story, 105 x 207 ft. building including automobile repair shop, etc. at 4128 Hayward Ave.

Mass., Brighton (Boston P. O.) — Boston & Albany R.R. Co., South Station, Boston, awarded contract for alterations to machine shop at Beacon Park Yard here. Estimated cost $50,000. C. A. Kirley, Ch. Engr.

Mass., Everett (Boston P. O.) — Merrimac Chemical Co., Chemical Lane, awarded contract for the construction of a 1 story garage. Estimated cost $40,000.

Mass., Hyde Park (Boston P. O.) — Condit Electric Mfg. Co., 344 Hyde Park Ave., awarded contract for addition and alterations to factory. Estimated cost $50,000. Noted Sept. 11.

Mass., Lawrence — Eastern Massachusetts Street Railway Co., 38 Chauncy St., Boston, awarded contract for alterations and additions to bus garage, etc., here. Estimated cost $25,000.

Mass., Leominster—Du Pont Vicoloid Co., 511 Lancaster St., awarded contract for a 3 story, 75 x 127 ft. addition to plant. Estimated cost $100,000.

Mass., Pittsfield—J. E. Aubry, 41 Pollock St., will soon award contract for the construction of a 3 story, 110 x 130 ft. garage on Summer St. Estimated cost $140,000. G. E. Haynes, 29 George St., Archt.

N. J., Fort Lee—Consolidated Film Industries, Inc., Lemoine Ave., awarded contract for the construction of a 1 story, 25 x 240 and 25 x 200 ft. machine shop and shipping building. Estimated cost $75,000. Noted Aug. 7.

N. J., Jersey City—Bergen Sq. Garage, c/o C. Shilowitz, 26 Journal Sq., awarded contract for the construction of a 5 story, garage. Estimated cost $500,000. Noted Sept. 18.

N. J., Newark — A. Kaminski, c/o R. C. Klemm, 944 Broad St., Archt., will soon award contract for the construction of a 1 story, 25 x 100 ft. factory and garage at 1820-22 Oxford St. Estimated cost $40,000. Noted Sept. 18.

N. J., Passaic—H. Schulting Jr., 38 Broadway, will not construct a 1 story work shop at Boulevard and Oak Sts. Estimated cost $40,000. B. J. Bellay, 625 Main Ave., Archt. Project in abeyance. Noted May 15.

N. Y., Flushing—Brein Holding Corp., 247 Langford Ave., Jamaica, is having sketches made for a 2 story, 125 x 192 ft. service garage at 40th St. and Main St. here. Estimated cost to exceed $45,000. W. Hohauser, Jamaica, Archt.

N. Y., New York—Forty Four West 66th St. Corp., will receive bids late in October for the construction of a 2 story garage. Block & Hesse, 18 East 41st St., Archts.

N. Y., New York — Hoffman Development Corp., 147 East 51st St., will receive bids about Dec. 1 for the construction of a 7 story service garage at 232 East 36th St. Estimated cost $75,000. C. Schaefer Jr., 332 East 149th St., Archt.

N. Y., New York—M. M. Luedke, Hawthorne, is having sketches made for the construction of a service garage at 65 West 99th St., here. Estimated cost $70,000. C. Schaeffer Jr., 332 East 149th St., New York, Archt.

N. Y., New York—Regina Loewenthal, 1880 Grand Concourse, is having sketches made for the construction of a 50 x 190 ft. service garage, etc. at Bailey Ave. and 230th St. Estimated cost $150,000. A. Slavin, 2690 University Ave., Archt.

N. Y., New York—Six Hundred Thirty West 55th St. Corp., M. Natanson, Pres., 527 5th Ave., will build a 6 story, 100 x 280 ft. service garage and factory. Estimated cost $400,000. F. S. Parker, 119 West 57th St., Archt. Work will be done by separate contracts. Noted Sept. 11.

O., Cleveland—Cleveland Steel Products Co., 7300 Madison Ave., manufacturers of oil burners, awarded contract for a 1 story, 78 x 90 ft. factory. Estimated cost $40,000. Noted Aug. 28.

O., Cleveland—Dobeckmun Co., T. F. Dolan, Pres., 1311 West 80th St., (machinery for the manufacture of Cellophane) awarded contract for the construction of a 1 story, 100 x 262 ft. factory on Monroe Ave. Estimated cost $75,000.

O., Cleveland — International Harvester Co., C. W. Mapes, Branch, Mgr., East 30th St. and Chester Ave., (motor trucks) awarded contract for a 1 and 2 story, 100 x 125 ft. sales and service station at Chester Ave. and East 30th St. Estimated cost $150,000.

O., Cleveland — Otis Steel Co., C. C. Wales, Const. Engr., 3341 Jennings Rd., had plans prepared for the construction of a 1 story continuous mill building. Estimated cost $400,000. Private plans.

O., Hartwell—Boye-Emmes Machine Tool Co., Spring Grove Ave., Cincinnati, awarded contract for a 1 story factory here. Estimated cost $60,000.

Pa., Bloomsburg—American Car & Foundry Co., plans to rebuild plant recently destroyed by fire. Estimated cost to exceed $150,000. Maturity indefinite. Noted Sept. 11.

Pa., Erie—Bender Marine Sales Co., c/o R. B. Way Co., 9th and Peach Sts., will soon receive bids for the construction of a marine, sales, service and storage building on State St. Estimated cost $50,000. Architect not announced.

Pa., Philadelphia—Wheeling Corrugating Co., 1234 Hamilton St., plans a 1 story, 250 x 265 ft. warehouse at Third St. and Hunting Park Ave. Private plans.

Pa., Pittsburgh—Jones & Laughlin Steel Co., 3rd and Ross Sts., awarded contract for the construction of a 1 story, 16 x 47 ft. mill on 34th St.

Pa., Pittsburgh — K. Simon, 160 Fullerton St., awarded contract for a 2 story, 45 x 65 ft. wagon shop. Estimated cost $40,000. Noted Feb. 27

Pa., Washington—G. Woodward, 426 East Wheeling St. (Dodge Autos), is having plans prepared for a 2 story, 75 x 135 ft. garage on East Maiden St. Estimated cost $40,000.

Pa., Wilkinsburg — Henny Pittsburgh Co., 1121 Penn Ave., awarded contract for the construction of a 2 story, 66 x 115 ft. garage and sales building at Penn Ave. and Montier St. Noted Sept. 4.

Tex., San Antonio — Cleveland Tractor Co., 1113 West Houston St., J. W. Francis, Cleveland, O., acquired a site and plans the construction of a sales and warehouse building at South Cherry St., here.

Wash., Longview—Campbell Fuel Co., plans the construction of machine shops and equipment repair plant at 11th Ave., also addition to garage.

Wash., Seattle—Port of Seattle, has plans made for a 38 x 48 ft. repair shop at 2000 West Garfield St.

B. C., North Vancouver—Vancouver Creosoting Co. Ltd., awarded contract for additions to creosoting plant, including wharf, tanks, treating cylinder and machinery. Estimated cost $150,000.

Ontario—Dept. of Public Works, Parliament Buildings, Toronto, plans improvements, repairs and additions in connection with provincial institutions, including two new vocational schools, $6,300,000. Total expenditure $19,529,500. F. R. Heakes, Parliament Buildings, Toronto, Archt.

Ont., Hamilton—W. L. McFaul, City Hall Engr., is preparing plans for the construction of civic machine and repair shops on Elgin St. Estimated cost including equipment $70,000.